The IRON AGE

March 12, 1959 A Chilton Publication The National Metalworking Weekly

From Production Control to Market Analysis:

How to Put Data Processing To Work

P. 121

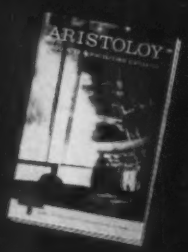
How to Buy Steel In a Rising Market — P. 83

Are Your New Product Ideas Paying Off? — P. 88

Digest of the Week — P. 2-3

ARISTOLOY

Electric Furnace Steels



NEW PRODUCTS & FACILITIES CATALOG
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Tool Steel Topics

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The IRON AGE

March 12, 1959—Vol. 183, No. 11

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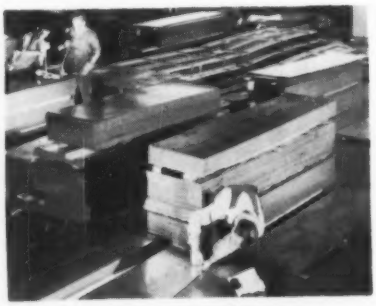
BUYING STEEL

The Westinghouse Way—There's no scramble to buy steel at Westinghouse Electric. Careful planning has avoided need for paying premiums during steel shortages. The main job is policing deliveries. P. 83



PRODUCT PLANNING

How It's Done—The element of chance is kept to a minimum in modern research programs. Here is a composite picture of how industry plans its new products. P. 88

RAILROAD CAR BUILDING

How Much Strain on Steel—It's still too early to tell how much strain recently-announced rail car building programs will put on the steel industry. But users welcomed word new cars are coming. P. 86

FEDERAL SALES TAX

A Possibility — We need more money to pay for the cold war, says a Washington tax advisor. The only

Metalworking

DATA PROCESSING: Its real value for Norma-Hoffmann Bearings Corp. lies in its ability to give management closer control over every phase of manufacturing. Checking production report are E. W. Mitchell, controller, and William Sellers, general foreman. P. 121

tax we haven't tried yet is the national sales tax. P. 103

AIR FORCE CONTRACTS

Careful Cost Check—The Air Force is warning contractors if overpricing continues a pre-audit of bids may be necessary. Check on contracts let shows gap between prices bid in and those current at the time. P. 105

FEATURE ARTICLES

ELECTRONIC INSPECTION

Gages Sort Close Fits—For precise fitting of mating parts, an electronic gaging and sorting setup boosts production capacity by as much as 400 pct for a bearing maker. Key to the gaging system is a short wave oscillator. P. 124

FORMING HEAVY PLATE

With Large Capacity Units—A new setup handles plate up to 4 in. thick by 12 ft wide. The units consist of a 2500-ton flanging press, extra-large plate bending rolls, and a furnace to handle the huge steel plates. The setup simplifies production of pressure vessels. P. 126

VINYL-COATED STEEL

For Color, Protection—A new process roller coats liquid vinyl on carbon steel sheet. Adhesion of coating is excellent even after severe deformation. The product can be punched, lock-seamed and even welded. P. 128

DUAL GRINDING

Crush & Centerless—By mating crush - true and centerless techniques, a new grinder saves machine time and speeds finishing of small parts. Big advantage comes in processing parts to close finish tolerances. P. 132

ALUMINUM DIE CASTINGS

Better Finish: New Uses—An acid etch is the key to improved plating of aluminum alloy die castings. It dissolves unwanted elements out of surface of parts. Now aluminum diecastings can be plated on a volume basis to compete more successfully with other plated products. P. 134

MARKETS & PRICES

TIN MARKETS

Firming Up — Steel companies are trying to make enough tinplate to satisfy hedging customers. It has set off a wave of tin buying that has firmed the market. Chances are it will stay strong. P. 89

GRAY IRON CASTINGS

Job Shops Aid Pick-up—Sales of gray iron castings are reviving, thanks largely to a step-up in job shop activity. Principal buyers: Press builders, construction, farm, transport equipment makers. P. 91

LIGHTWEIGHT TRUCKS

They're Coming — Heavy - duty truck builders hope to lop off deadweight by using aluminum, plastics, and new frame design. Reducing fever may soon spread to smaller truck manufacturers. P. 99

BRITISH TOOLS

More Competition—One British toolmaker sees U. S. as his biggest export outlet. Price will be an important selling point, he says, but quality will be stressed. P. 107

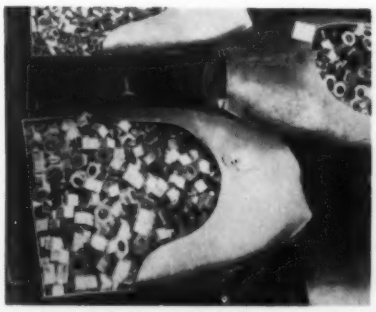
LOOKING AHEAD

Third Quarter Steel Orders—Some steel users are jockeying for position on third quarter mill order books. They want to be in line for quick delivery at the end of a steel strike—should there be one. P. 171

NEXT WEEK

NEW FASTENERS

Upgrading an Industry — Few areas of metalworking have responded to changing times more readily than the fastener industry. Next week's special report tells how fasteners are changing from a tonnage to a precision industry.



vertical edging mill

The overhead design of this edging mill is the key feature of this typical PITTSBURGH installation. Increased operational efficiency is a natural result of special design.

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Dr. J. N. BERRETTONI, *Director of Statistical Quality Control, asks...*

What's your fastener AQL?

Here are important keys to obtaining *guaranteed fastener quality* to meet your specific needs.

Careful evaluation of print tolerances is the first step. This means placing each dimension into a critical, major or minor category. For example, a major category may be one where only one dimension in a hundred is allowed to be out-of-tolerance. This 1% then becomes the Accepted Quality Level (AQL). The same type of evaluation is applied to physical and chemical characteristics, plating requirements.

Clear definition of your quality levels can also help reduce your costs. Example: recent quality evaluation of a special fastener showed that, out of a total of twelve dimensions, only two were "majors". Why pay for twelve major dimensions when only two are really essential?

L & S quality level guarantees, evidenced by written certifications, are based on the extensive use of statistical quality control methods. We use MIL-STD-105A, MIL-STD-414, and Dodge and Romig tables to certify incoming raw material and outgoing finished product. For process certification, quality control methods and charts of Dr. W. A. Shewhart are employed at every stage of manufacturing.

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Outside Interference: Bane of Steel Labor Talks

When John L. Lewis—in 1937—convinced the late Tom Moses that steel workers should be organized, he started the ball of "outside interference" rolling.

For many years the New Deal and its similar successor took good care of the steel workers' union. Government pressures generally helped the union get its demands at management's and the consumer's expense.

The same pressures which aided the steel union kept the steel firms from exercising real collective bargaining.

The late Philip Murray, and now Dave McDonald, got used to special treatment at the hands of "friendly" administrations. Even in 1956 the present Administration used its power to force a settlement of the steel strike: A settlement that has whetted the "appetite" of every labor leader in the country.

Now Senator Kefauver has indicated he thinks the steel union should settle this summer for no more than a productivity gain. By doing this the Senator feels that steel firms will not—if he can help it—raise steel prices.

At the same time Mr. Eisenhower has surprisingly expressed similar views at a press conference. Ike still leaves the door open to steel firms for free enterprise, profits and no "threats." But he still "interfered."

To all this, Dave McDonald has bellowed that the Senator should "keep his nose out of my business." To which the Senator answered timidly that it is his business, too. Steel concerns have kept their mouths shut. They have had no comment on Senator Kefauver's and Ike's sojourn into the brackish waters of pre-negotiation steel labor pressures.

Everyone knows—or should know—that the union monopoly has little to fear from Ike or from Senator Kefauver. But the steel industry has felt the lash of interference from senators and presidents before. Once again they are approaching a "heads I win, tails you lose" situation.

If we live in a democracy and if we still have free enterprise, then we can't have a half-baked statism approach telling either side what to do before they even take each other's measure.

Let's let collective bargaining work without outside pressures!

Tom Campbell

Editor-in-Chief

Industry steel savings with the use of Amchem Rodine* would reach from earth to moon!

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save on acid!
save on pickling costs!

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RODINE

* *Based on estimated steel production of 40 million tons per year, the savings in acid with the use of Amchem Rodine would be 4 pounds per ton, which approximates 2 pounds of steel saved per ton. Produced in the form of one-quarter inch diameter wire, this steel would stretch to a distance of 240,000 miles—ample enough to reach from earth to the moon with mileage to spare!*

Amchem Rodine is another chemical development of **Amchem Products, Inc.** (Formerly American Chemical Paint Co.) Detroit, Mich. • St. Joseph, Mo. • AMBLER 26, PA. • Niles, Calif. • Windsor, Ont. / Amchem and Rodine are registered trademarks of Amchem Products, Inc.

Tungsten Bows to Forming

An important metallurgical breakthrough marks the successful deep-drawing, spinning, and forging of tungsten into complex shapes. All such forming is done at very high temperatures—above the melting points of stainless and some super-alloys. Since the melting point of tungsten is above 6000°F, these new processing techniques are expected to contribute significantly to the development of improved rocket nozzles and re-entry nose cones.

Testing Ionic Propulsion

Government researchers are getting ready to start advanced testing of an ionic propulsion motor for missiles. Facilities for tests of this super engine were delivered recently. Theoretically, such an engine could drive a rocket at close to the speed of light in outer space. Development is years away, but the program is moving ahead steadily with promising results.

Titanium-Carbide Tool Bits

Said to have up to 10 times the cutting life of the best tungsten carbides, titanium-carbide tool bits are a new advancement for machine tool operations. The development is hailed as relieving the country's dependence on imported and highly strategic tungsten.

Impacts for High Production

Thin-wall extrusions of light metal are catching on for high production jobs. A major supplier of automotive parts is operating a horizontal press in an integrated setup. The unit precision impacts an aluminum speedometer drum 13½ in. long x 2⅛ in. diam. Wall thickness is 0.010 in. The company is examining other uses. One advantage is ability to incorporate nut heads on such parts as filter covers.

Explosive Form in Stages

Explosive forming teams find that multi-stage forming works better than one big blast. Steel pipe, for example, expands in stages to where it would break under one big blast. Some forming has even been done on tungsten. Under design, a special explosive forming press will use a vacuum between the workpiece and the die to increase explosive force. Explosive velocities will be 400-700 fps compared to 100-150 fps with compressed-air types.

Prepare Surface for Enamel

One answer to a low-cost one-coat porcelain enameling steel may be in a special brushing of the surface of cold-rolled sheet. One company is deep at work on the problem of eliminating trapped gases to prevent blisters under porcelain coat. Single coating would make porcelain appliances compete pricewise with painted surfaces.

Car Orders Boost Castings

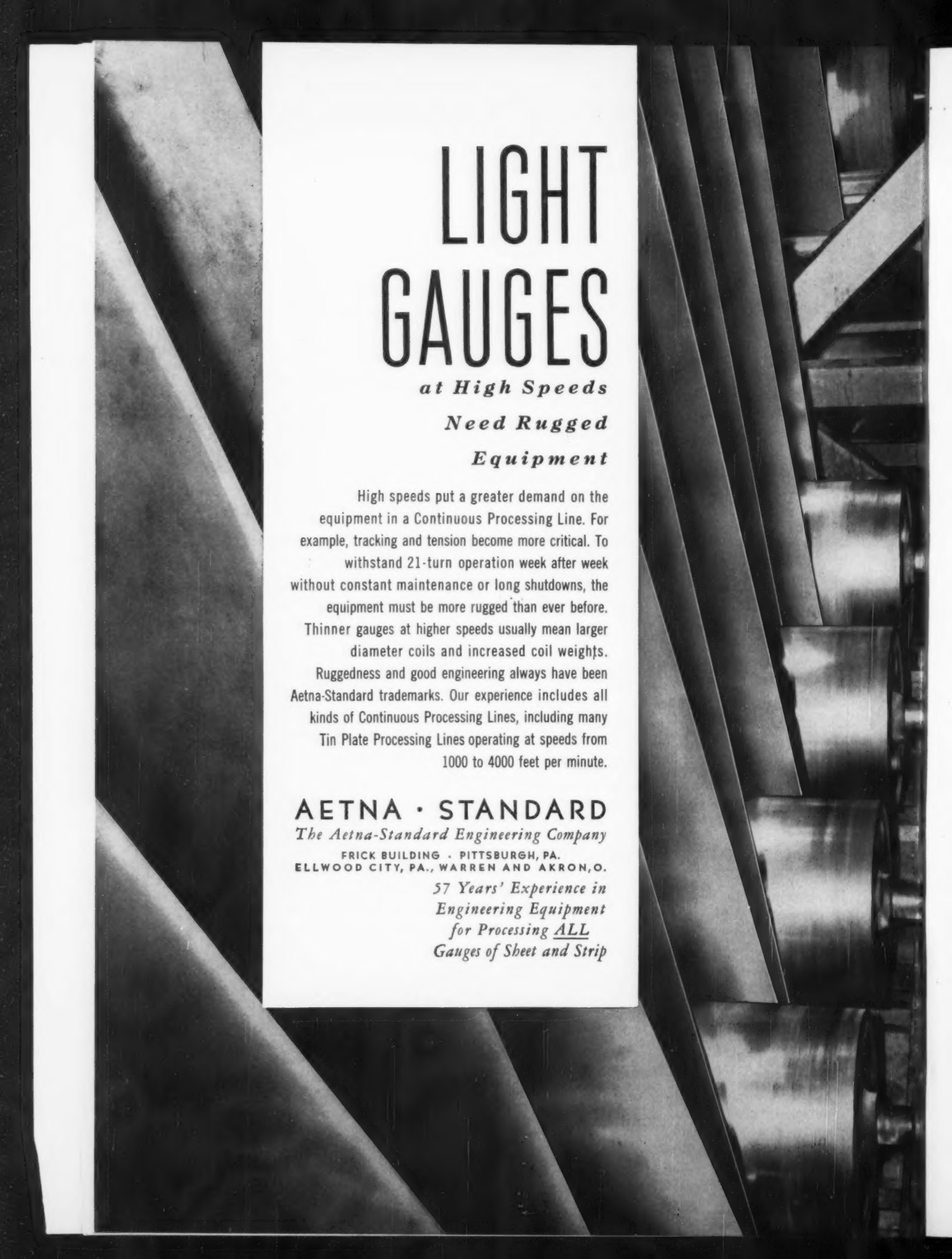
Due to growing number of railway car orders, shipment of steel castings is showing a boost. Some producers have already reached first quarter 1958 production level. While most of the surge comes from new car orders, earlier gains can be traced to car rebuilding and the meeting of new AAR specifications. Effect has been to cause casting backlogs as great as 6 weeks.

Look Beyond Steel Strike

Smart purchasing men are starting to think now about booking steel for July and August. They want to be on the books at the close of any strike. What's the good of stocking steel before a strike, if you're stuck at the end of it, asks one purchasing man. At least one mill is already taking third quarter orders.

West Coast Steel Probe

Keep an eye on the West Coast structural steel anti-trust probe. Top Justice Department attorneys say privately it could be the first step in a drive to break up U. S. Steel. If the grand jury at San Francisco returns a criminal indictment, this case will be limited to price-fixing charges. Then, if the government wins, officials indicate they may file a civil case.



LIGHT GAUGES

at High Speeds

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High speeds put a greater demand on the equipment in a Continuous Processing Line. For example, tracking and tension become more critical. To withstand 21-turn operation week after week without constant maintenance or long shutdowns, the equipment must be more rugged than ever before. Thinner gauges at higher speeds usually mean larger diameter coils and increased coil weights. Ruggedness and good engineering always have been Aetna-Standard trademarks. Our experience includes all kinds of Continuous Processing Lines, including many Tin Plate Processing Lines operating at speeds from 1000 to 4000 feet per minute.

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Taxpayer Revolt

Sir — Regarding your editorial "Taxpayers' Revolt: It's Coming Sure as Rain" (Feb. 19 issue): This is a very fine non-partisan article. The people in our office all agree wholeheartedly and would like to know if it is permissible to make reprints. — W. H. Smith, Product Engr., Sylvania Electronic Tubes, Div. of Sylvania Electronic Products, Inc., Brookville, Pa.

Sir—Your editorial hits the spot as to taxpayers' revolt.

Can you, and will you, supply us with 175 reprints. It is our plan to mail these as promptly as possible to all of the Maryland state senators and delegates now in session, most of them threatening to "feather their nests" by getting more of my money through taxation.—A. G. Harkins, Pres. and Treas., The Maryland Steel Products Co., Baltimore.

Sir—We have read this editorial with interest.

We would appreciate receiving your permission to reprint it for distribution to the employees of Electric Steel Foundry Co.

We have enjoyed your other editorials on numerous occasions and wish to take this opportunity to compliment you on the unbiased stand you have taken on many controversial problems which affect management, labor and the general public.—D. R. Babbitt, Plant Mgr., Electric Steel Foundry Co., Danville, Ill.

Loss of Pride

Sir—One of your recent editorials discussed "Pride of Workmanship—What Has Happened to It." May I suggest the worker is not to blame for a lack of good workmanship.

The supervisor no longer supervises. He merely accepts orders from the production engineer and passes them on to the worker. The supervisor cannot employ or permit the worker to employ the ways and means of getting quality.

There's too much faith put in book learning rather than actual on-the-job training. From what I see the worker is ashamed of his workmanship and of his supervisors.—H. L. Himes, Reynoldsville, Pa.

Dielectric Embossing

Sir—Your Feb. 5 issue carried a feature article entitled "Dielectric Press 'Welds' Vinyl-Covered Sandwich Panels."

As technical editor of the Fisher Body department responsible for the development described in this article, I would appreciate receiving four reprints for distribution to the engineers working on dielectric embossing.

We would like to compliment the author Ralph Eshelman for doing a fine job in presenting a rather complex subject to your readers. The article was both accurate and interesting.—P. M. Zimmerman, Sr., Production Engr., Fisher Body Div., General Motors Corp., Detroit.

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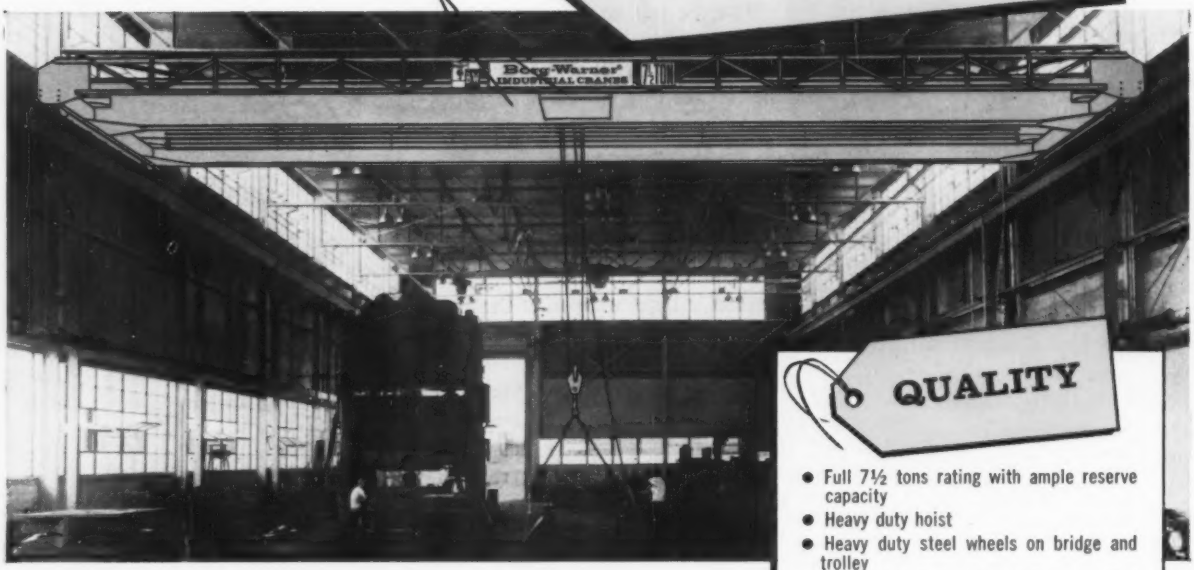

QUALITY

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- All welded jig bored and jig assembled end trucks
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MODERN DESIGN

The crane illustrated is a typical double girder installation. For shorter spans, smaller capacities and lighter or intermittent duty Borg-Warner Industrial Cranes can supply your needs at even lower prices.

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Borg-Warner Industrial Cranes offers a complete line of overhead cranes . . . for light, medium or heavy service . . . constant or intermittent service at slow, medium or high speeds . . . operation from cab or floor. Get in touch with B-W Industrial Cranes today for answers to your materials handling problems.

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1510 S. PAULINA STREET, CHICAGO 8, ILLINOIS

Export Sales: Borg-Warner International, 36 South Wabash Ave., Chicago 3, Illinois

Accounting Plus

"Most of the more than 30,000 data processing systems now in use are set up in accounting departments."

That's the statement E. W. Mitchell, controller, Norma-Hoffmann Bearings Corp. makes in "How to Get More From Your Data Processing System."

Mr. Mitchell goes on to point out for full value a data processing department should serve all departments, not just accounting.

For a report on what data processing can do in such areas as production scheduling, quality control, and order processing—as well as in accounting—we recommend the article beginning on p. 121.

Low Down Trick

Who says big, bulky cars cause all the parking problems?

Those tiny foreign-made autos are also giving parking lot attendants headaches. Seems the little cars can be sneaked under the toll gates and parked free.

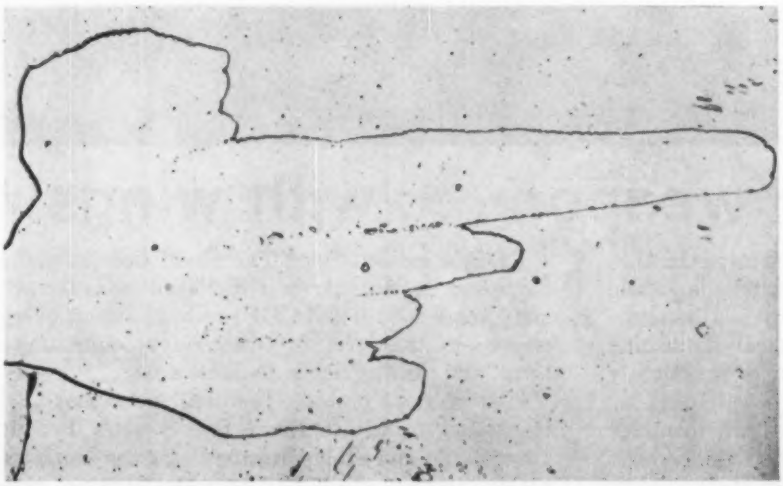
Perhaps lot owners will hire midgets in order to fight the problem at the right level.

Puzzlers

There was a lot of bull in that cow puzzler. It looks from here that she had 34,227.1182 sq ft of grazing area. E. Dubicki, Fairchild Astrionics Division says about the same as does R. Sundewall, Anaconda Wire & Cable, Jim Davis, Fairless Works, and V. B. Riley, H. B. Smith Machine Co.

Want to try another? All except eight of the livestock owned by Farmer Jones were horses. All except six were cows and all except four were pigs. How many horses, cows and pigs did he have?

Western Vogue Spreads to Metals



HE WENT THAT-A-WAY: This looks like a signpost displayed on a TV Western. Actually it's what showed up when the grain structure of a nitrided zirconium crystal bar sample was magnified 100 times and photographed. Picture was made by engineers at Bettis Atomic Power Div. plant, operated by Westinghouse for the Atomic Energy Commission.

TOPS 'EM ALL

IN QUALITY OF TUBING

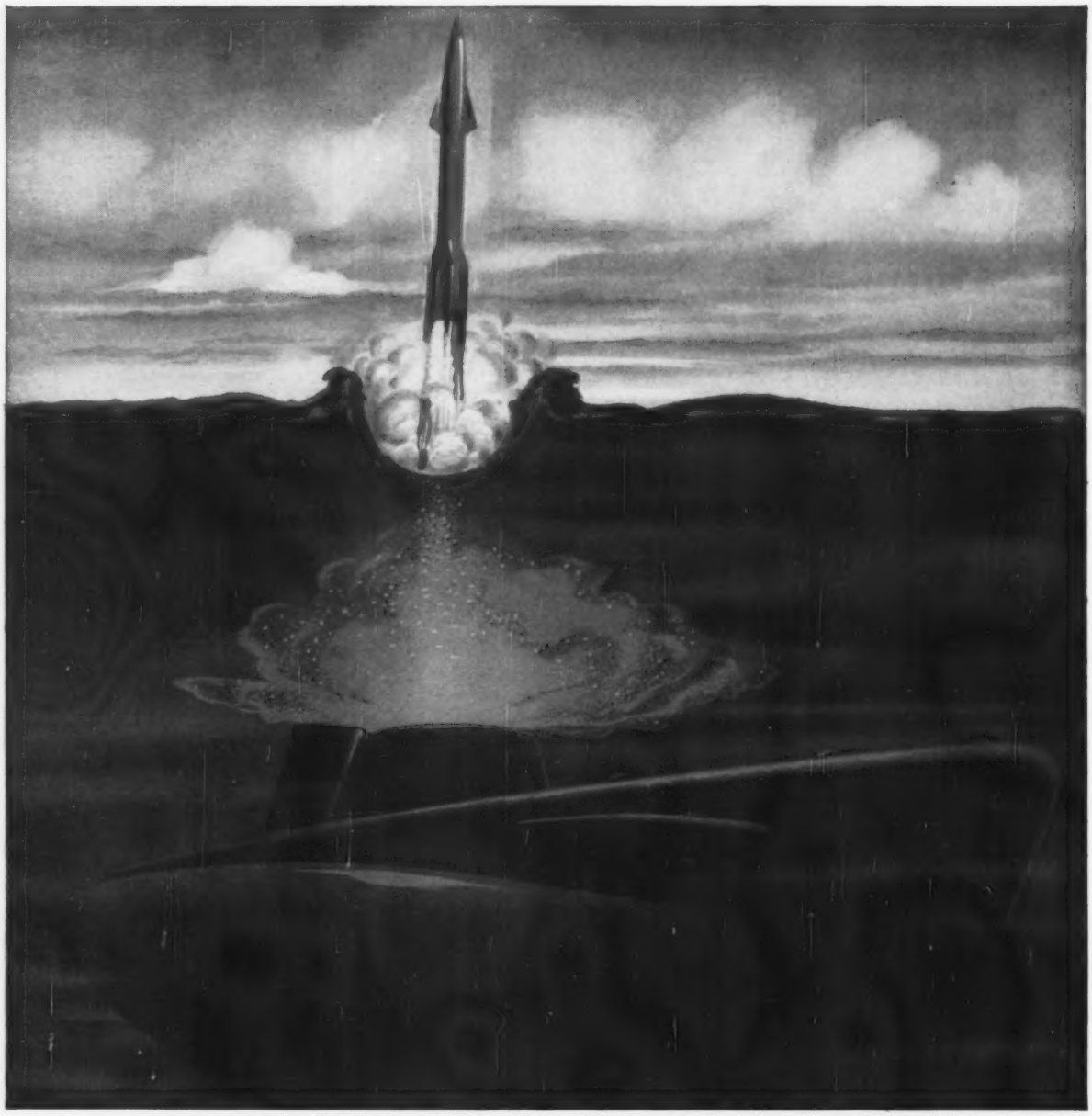
Comparative quality tests by one of America's leading users of tubing proved only Precision Tubing rates excellent in all specifications . . . yet Precision Tubing costs no more.

Precision Tubing is unequalled and unsurpassed in quality tests of accuracy, temper, straightness and roundness. You are sure of extra quality in every size tube at regular mill prices. Available in sizes from .010" to 1.125" O.D. in copper, brass, aluminum, up to ⅝" O.D. in nickel and nickel alloys, Ni-Span "C", phosphor bronze and nickel silver. In straight random lengths, coils or preformed shapes to specifications.

Write for catalog and technical data to Dept. 9, Precision Tube Company, Inc., North Wales, Pa.

GET THIS NEW TUBING DATA CATALOG

PRECISION TUBE COMPANY



Underwater weapon . . . with wings!

A major American weapon is shaping up in the U.S. Navy. It's the *Polaris*—a new guided-missile system designed for underwater firing from a nuclear-powered submarine. These mobile, elusive launching sites make defense against Polaris practically impossible.

The heart of this deadly weapon is a complex guidance and fire-control system, now under joint development by the Navy and private industry. Without rugged, reliable electrical insulations, such as those CDF supplies, these intricate electronic controls simply wouldn't work.

CDF, a subsidiary of The Budd Company, has pioneered dependable electrical insulations for over sixty years. You'll find CDF products almost everywhere—in the aircraft, automotive, communications, and railway fields, to name a few.

Have you a "problem product"—one that CDF insulation could improve? See Sweet's Product Design File and other directories for the name and phone number of your CDF sales engineer. Send your print or your problem; we'll return pertinent technical literature and recommendations.

CDF CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 85, DEL

COMING EXHIBITS

Western Metal Show—March 16-20, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Corrosion Show — March 16-20, Chicago. (National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas.)

1959 Nuclear Congress—Apr. 5-9, Cleveland Auditorium, Cleveland. (Engineers Joint Council, 29 W. 39th St., New York 18.)

Welding Show—Apr. 6-10, International Amphitheatre, Chicago (American Welding Society, 33 W. 39th St., New York.)

Engineered Castings Show — Apr. 13-17, Sherman and Morrison Hotels, Chicago. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Packaging Exposition—Apr. 13-17, International Amphitheatre, Chicago. (American Management Assn., 1515 Broadway, N. Y.)

Powder Metallurgy Show—Apr. 20-22, Sheraton - Cadillac Hotel, Detroit. (Metal Powder Industries Federation, 130 W. 42nd St., New York 36.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

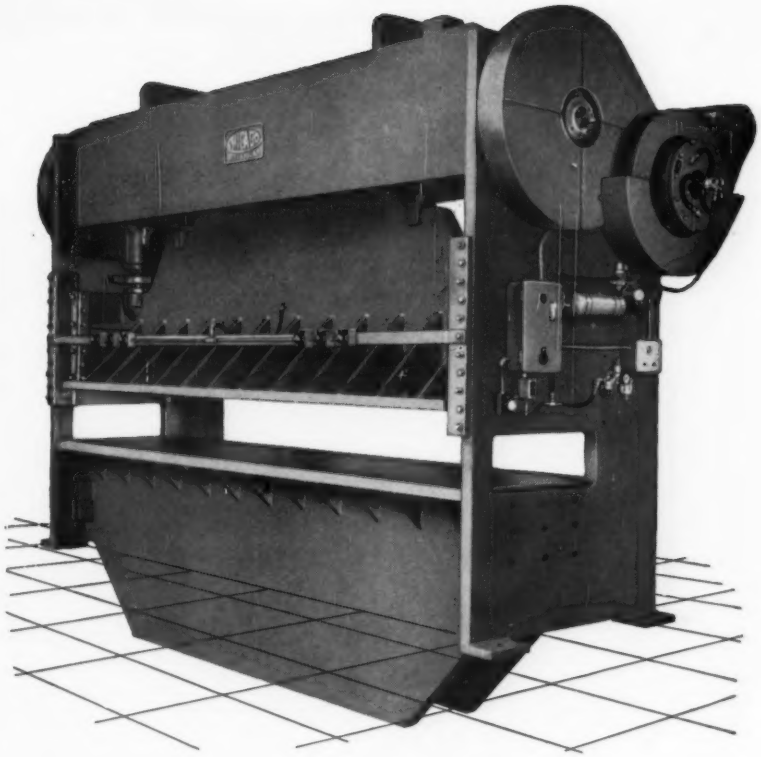
Material Handling Show — June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

MEETINGS

MARCH

American Institute of Chemical Engineers—National meeting, Mar. 15-18, Haddon Hall, Atlantic City, N. J. Institute headquarters, 25 W. 45th St., New York 36.

(Continued on P. 16)



CHICAGO DREIS & KRUMP

PRESSES

STRAIGHT-SIDE TYPE

large die area

capacities up to 400 tons

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

6874

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7430 South Loomis Boulevard, Chicago 36, Illinois

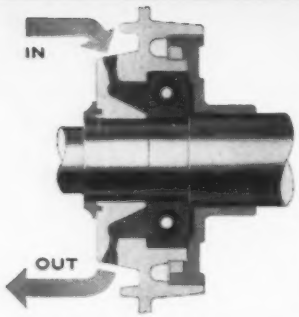
Elliott C-W SEALEDPOWER Motors now available up to 300 hp, in totally-enclosed, fan-cooled and explosion-proof designs

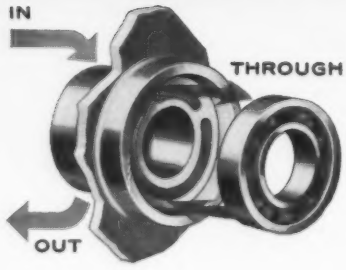
with

ELLIOTT C-W SEALEDPOWER MOTORS

you choose the type of bearings

For most applications, open greasable bearings will serve dependably and economically. But for use where lubrication maintenance is difficult, Elliott offers a pre-lubricated cartridge type which requires no service lubrication.





OPEN GREASABLE BEARING

The drawings show how fresh lubricant, forced through bearings with motor running, positively flushes out old grease. Requires infrequent attention. Advance design prevents over-lubrication and protects against entrance of moisture.

PRELUBRICATED BEARING

No service is required for the Elliott cartridge-type factory-prelubricated bearing. Grease reservoir and internal cap help seal and protect the bearing

GET ALL THE FACTS
about Elliott C-W SEALEDPOWER Motors. New Bulletin PB 6000-2 has interesting data. Send for free copy.

W 9-4

ELLIOTT Company

CROCKER-WHEELER PLANT JEANNETTE, PA.

EXHIBITS, MEETINGS

(Continued from P. 15)

Society of Automotive Engineers—National passenger car, body, and materials meeting, Mar. 16-18, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 485 Lexington Ave., New York 17.

Society for Non-destructive Testing, Inc.—Western regional convention, Mar. 16-20, Ambassador Hotel, Los Angeles. Society headquarters, 1109 Hinman St., Evanston, Ill.

Investment Casting Institute—Meeting, Mar. 17-19, The Surf Rider, Santa Monica, Calif. Institute headquarters, 27 E. Monroe St., Chicago.

American Machine Tool Distributors' Assn.—Spring meeting, Mar. 17-19, The Sheraton-Park Hotel, Washington, D. C. Association headquarters, 1900 Arch St., Philadelphia.

Electronics Industries Assn.—Quarterly meeting, Mar. 18-20, Statler Hotel, Washington, D. C. Association headquarters, 1721 DeSales St., N. W., Washington.

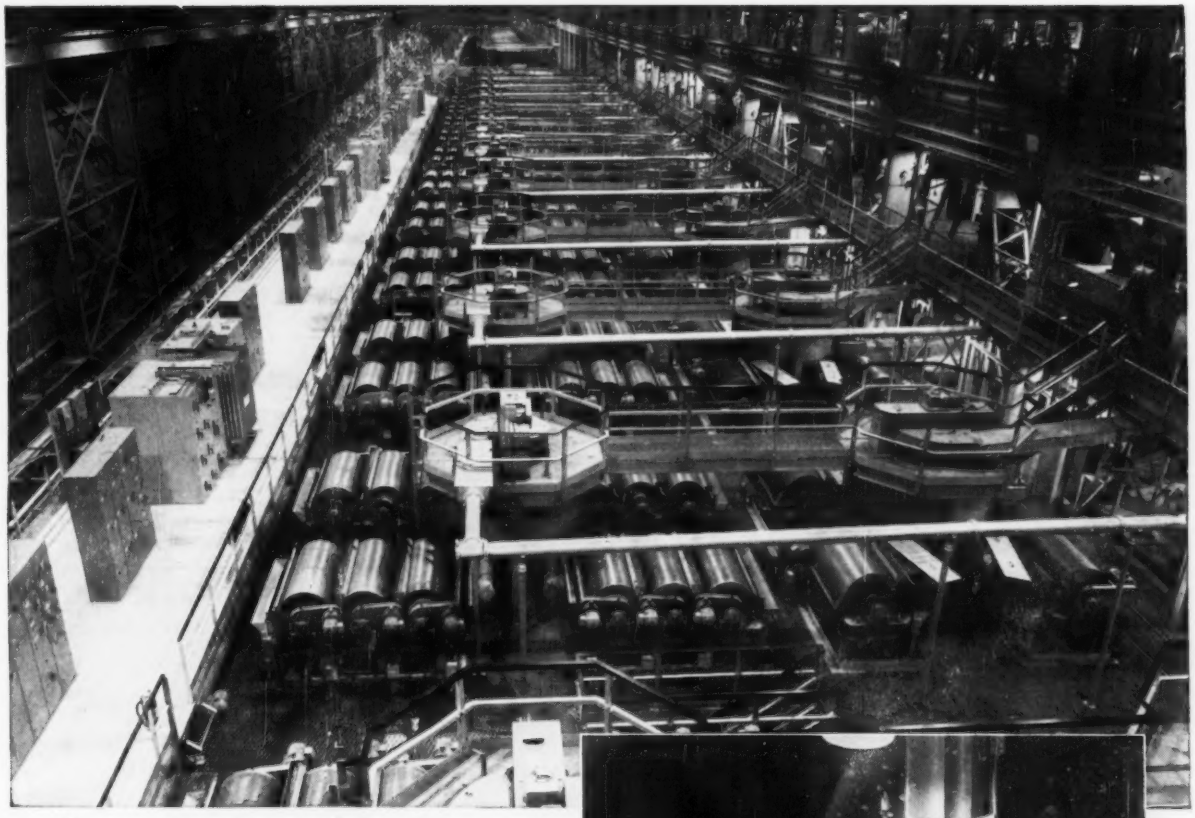
APRIL

Gas Appliance Manufacturers Assn.—Annual meeting, Apr. 1-3, Americana Hotel, Bal Harbour, Fla. Association headquarters, 60 E. 42nd St., New York.

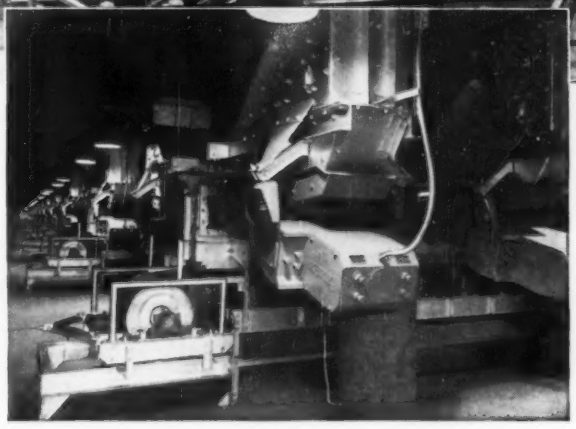
National Assn. of Waste Material Dealers, Inc.—Annual convention, Apr. 6-8, Edgewater Beach Hotel, Chicago. Association headquarters, 271 Madison Ave., New York.

Building Research Institute — Annual meeting, Apr. 6-8, Penn Sheraton Hotel, Pittsburgh. Institute headquarters, 2101 Constitution Ave., Washington 25, D. C.

American Hot Dip Galvanizers Assn., Inc.—Annual meeting, Apr. 7-8, Empress Hotel, Miami Beach, Fla. Association headquarters, 1806 First National Bank Bldg., Pittsburgh.



Jeffrey magnetic separators help raise iron content of pellets to 64%.



Jeffrey vibrating feeders keep ore on the move.

New Taconite Plant sets 24-hour, year-round pace!

IRON YIELD of the Mesabi Range is being greatly extended by a new plant which can, *every day*, turn about 63,000 long tons of taconite ore into approximately 20,000 tons of pellets bearing up to 64% iron. Efficient, trouble-free Jeffrey equipment is an important part of the vast and highly mechanized operation which makes this processing economically practical.

Jeffrey Magnetic Separators – 216 ball mill roughers and finishing separators are used in concentrator operations. After proper settings are made, feed may vary from zero to maximum capacity without further adjustment. Separators furnished in both permanent and electro types.

Jeffrey Vibrating Feeders – 48 heavy duty 5DTS units feed coarse ore from surge bins to cone crushers and screens. 324 Type 4DTH units feed fine ore to rod mills. 48 Type 4DTS feeders handle hot pellets. Balanced vibration assures quiet operation, definite control, easier installation, low operating and maintenance costs.

In all types of mining and processing of solids, carefully engineered, precision built Jeffrey machinery and components provide long, dependable service. Write for Catalog 910. The Jeffrey Manufacturing Company, 925 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

Porter-Cable Machine Co. uses 2" Jalcase 100 bars to produce these gears for portable electric belt sanders. Jalcase 100 reduces down time, eliminates heat treating and cuts tool costs.

"Jalcase 100 increased tool life 50%, eliminated need for heat treating"

. . . reports Porter-Cable Machine Co.

"J&L's Jalcase 100 meets our requirements for a steel that satisfies these four specifications:

1. Enough hardness for use in gears and jack shafts without need for heat treating;
2. High machinability for profitable operation without down time;
3. Uniform metallurgical structure;
4. Minimum distortion from residual stresses.

"Our shop experience with Jalcase 100, on six-position automatic machines with up to 21 high speed tools, shows tool life is increased at least 50%, hob life increased 30%," states Porter-Cable Machine Company official, Syracuse, N.Y.

Jalcase 100 is a new grade of Jalcase cold finished steel bars, specially processed for easy machinability with minimum distortion. It features guaranteed minimum yield strengths up to 105,000 p.s.i., guaranteed minimum hardness up to 248 Brinnell, and stabilized residual stresses. A new leaded product known as Jalcase 100-L is believed to be the most machinable high strength steel yet developed.

Call in a J&L steel specialist for a recommendation on the cold finished steel bars best suited for your specific operations. Chances are he can speed your production, cut your machining costs. See your local distributor, or write to Jones & Laughlin, 3 Gateway Center, Dept. 563, Pittsburgh 30, Pennsylvania.

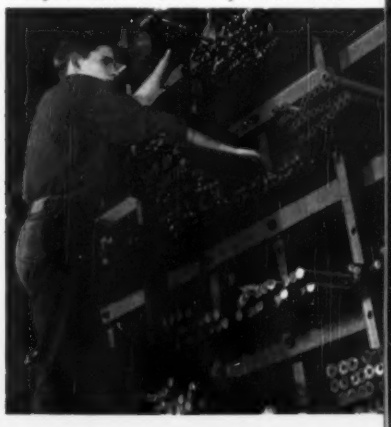
Jones & Laughlin Steel Corporation

PITTSBURGH, PENNSYLVANIA

Where cold rolled steels originated in 1859

Final J&L pre-shipment spot inspection

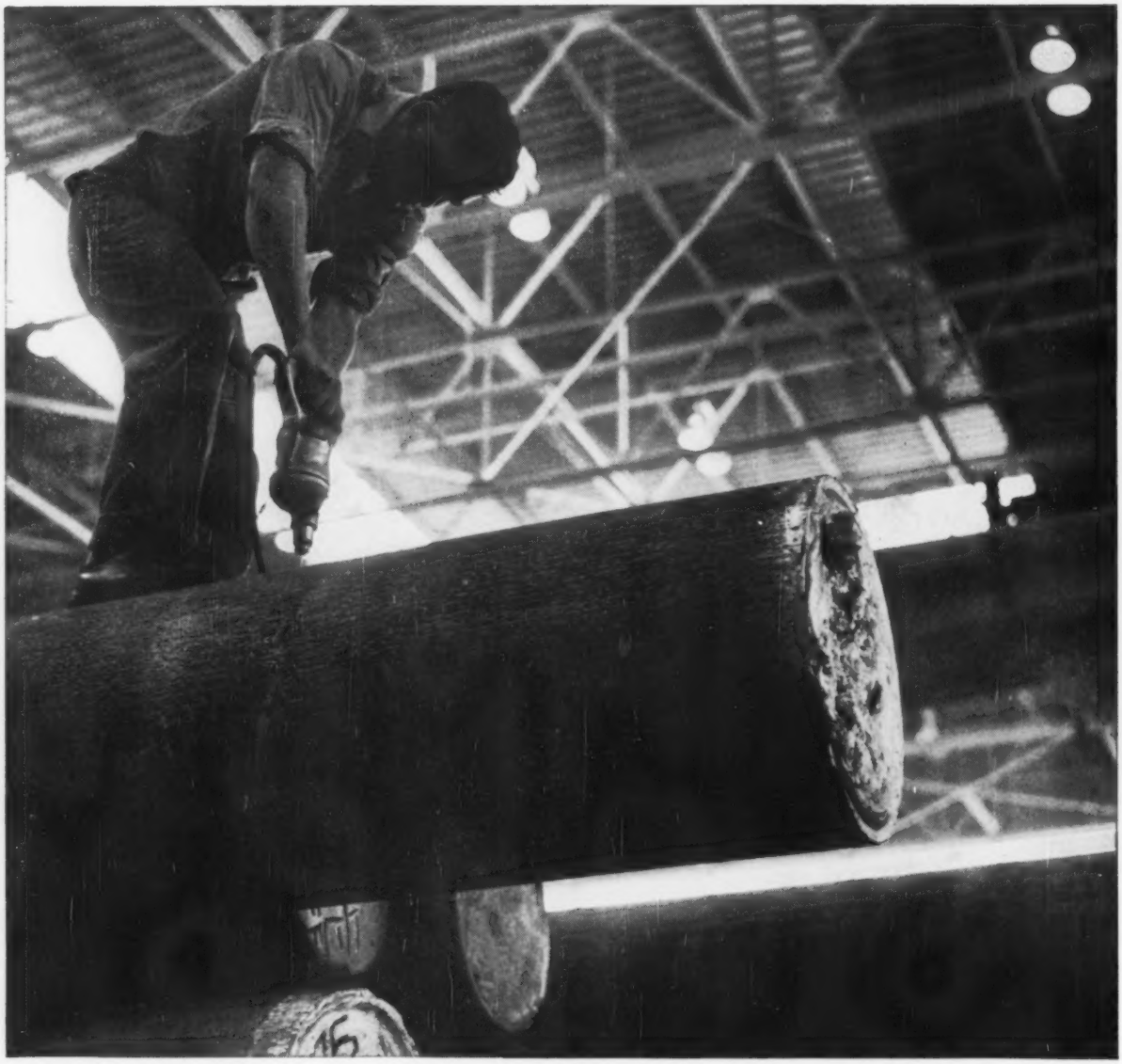
Many bar sizes are used by Porter-Cable



Helical gear cutting hobs last longer

Increased tool life speeds production

High wear resistance is assured



Kaiser Aluminum ingots being prepared for "homogenizing" in Gas-fired furnaces prior to extrusion into aircraft parts

GAS assures precision alloy extrusions at Kaiser Aluminum

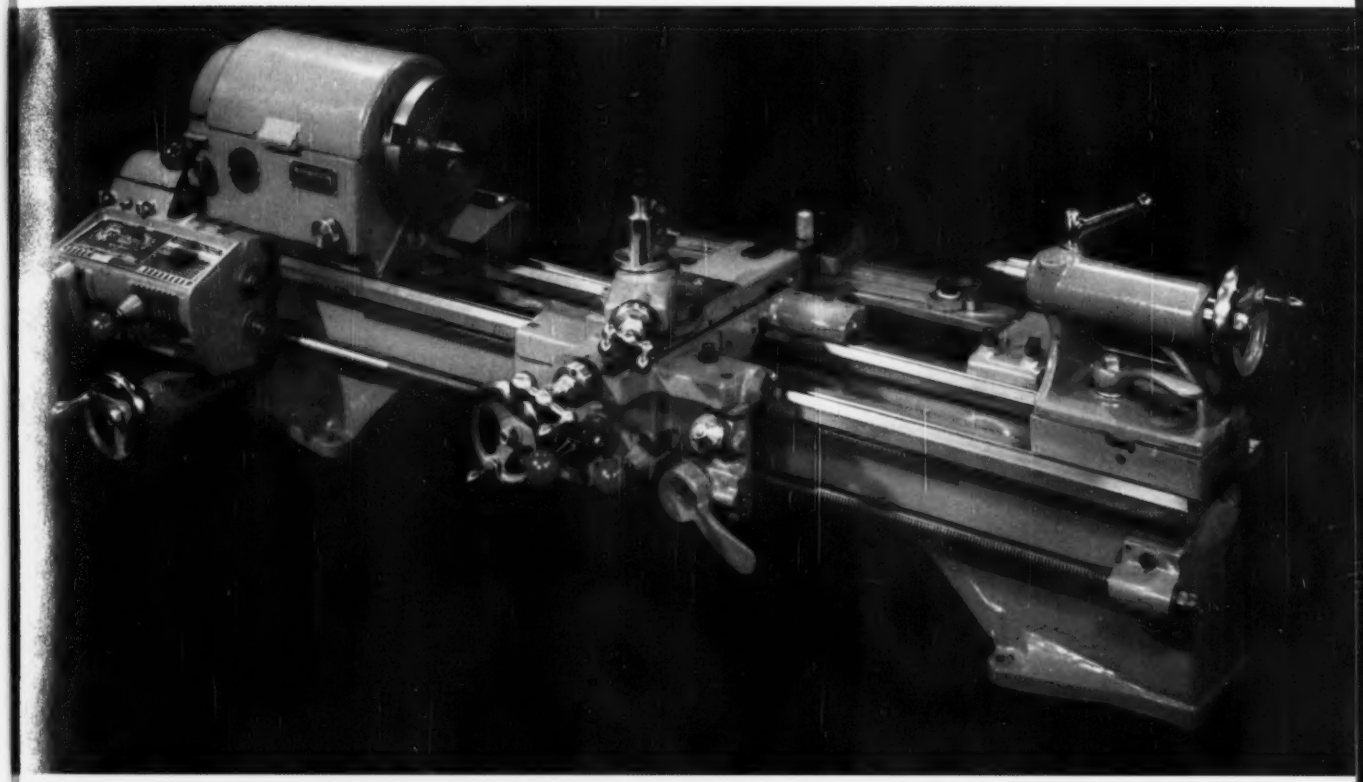
Gas plays a major role in the development of precision quality alloy extrusions for aircraft at the U. S. Air Force Heavy Press Plant operated by Kaiser Aluminum at Halethorpe, Maryland.

With Gas, uniform temperature and controlled atmosphere keep molten aluminum flowing smoothly into casting equipment. The metal is cast into logs about 12 to 26 inches thick and 25 feet long. Gas-fired furnaces heat the logs to 1000° F and hold this temperature about 24 hours to homogenize the metal prior to extrusion. The long logs are cut into 58 inch billets, placed on the press and extruded into various shapes.

Again, Gas is used to heat the extruded shapes in a controlled atmosphere to impart the desired physical qualities in the alloys used. As in the melting process, Gas provides precise temperature control and close control of atmosphere within the furnace.

For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results Gas and modern Gas equipment provide. *American Gas Association.*

NEW from DELTA



10″ METAL LATHE can't be matched for performance, capacity, or real value!

The many items of standard equipment *include* variable speed drive (complete with belts) and thread chasing dial at no extra cost. Specially designed, extra rigid Delta bench and complete line of accessories also available.

You'll like everything about this all-new Delta 10″ Lathe—its modern look, on-the-job performance, and the low price—just $645.00! Designed for industry, schools or home workshops, it fills the need for a safe, low cost, precision lathe with heavy-duty capacity.

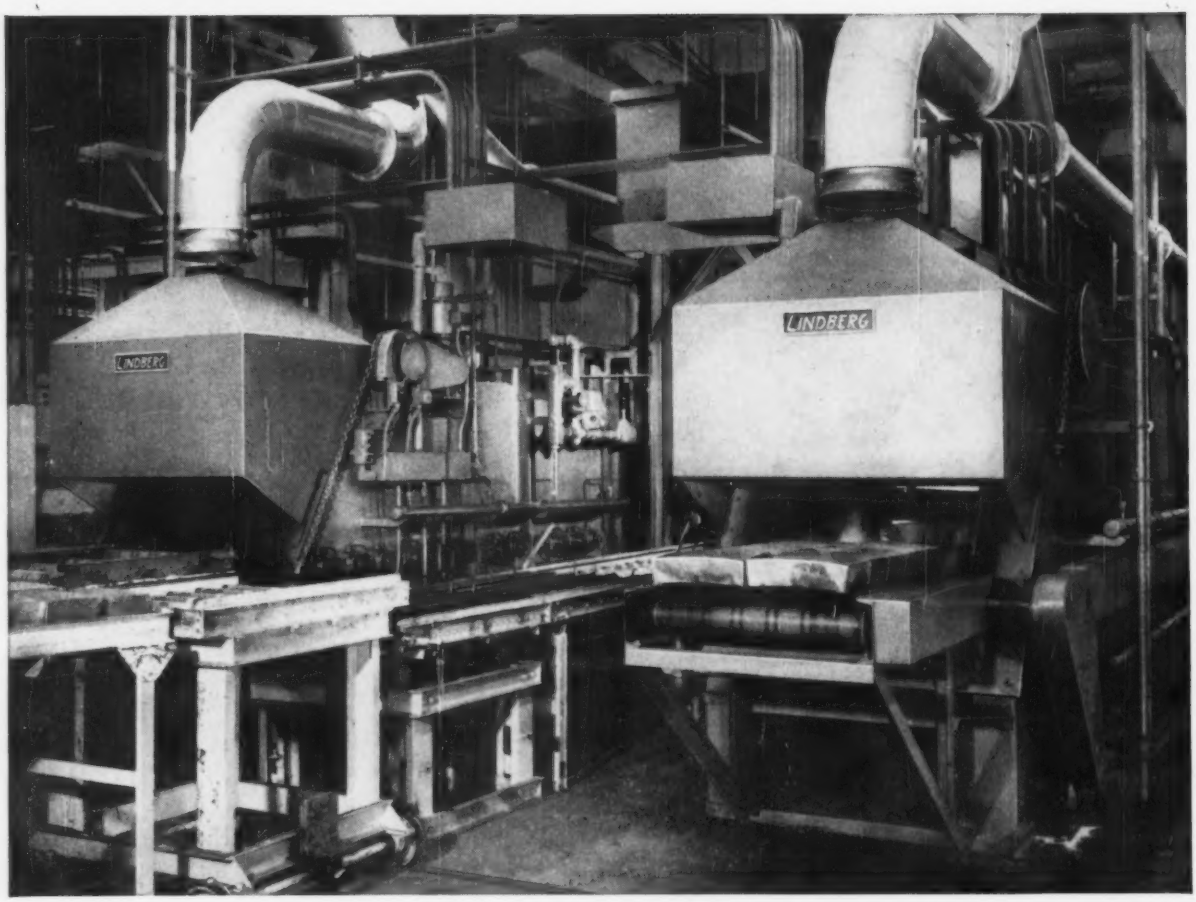
And you get this exclusive combination of Delta Quality features never before available on a lathe this size at comparable cost: variable speed drive, ¾″ collet capacity, massive, double row, precision ball bearing at the work load end of the spindle.

SEND FOR NEW LATHE CATALOG —Pictures, describes and catalogs the new 10″ lathe plus the complete line of Delta Metal Lathes and full range of accessories. For *free* copy and list of Delta Lathe Dealers write: Rockwell Manufacturing Company, Delta Power Tool Division, 400C N. Lexington Ave., Pittsburgh 8, Pa.

DELTA METAL LATHES

another fine product by

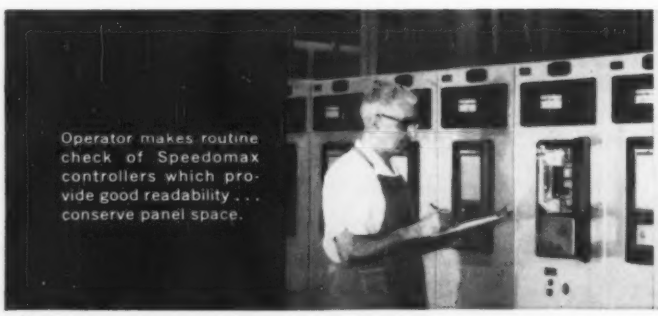
ROCKWELL



Automatic Electric Company: Speedomax H controllers closely regulate temperature of annealing furnaces which are completely automatic except for loading and unloading.

Control of heating and cooling temperatures a problem?

Not at Automatic Electric Company, where Speedomax® H controllers are helping to anneal magnetic properties into cores, armatures and heel pieces of quality relays and switches. These devices find wide use in telephone, industrial and military equipment . . . demand and get the best in production control. To obtain optimum magnetic properties, these components are put through a continuous 5-zone Lindberg furnace with heating and cooling temperatures closely controlled by Speedomax H. Rugged, compact and completely reliable, Speedomax H is providing the same dependable control on numerous heat treat processes . . . is helping produce both process economies and a quality product. *Whatver your heat treating process, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office or write 4956 Stenton Avenue, Philadelphia 44, Pa.



Operator makes routine check of Speedomax controllers which provide good readability . . . conserve panel space.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

New book tells full story of stainless pipe and tubing

If you use stainless or high alloy pipe or tubing, this new illustrated handbook was written for you. It's 58 pages big — packed with informative data that you'll refer to again and again.

The table of contents is too long to list here, but it includes, for example, analysis and conversion tables, corrosion characteristics, weights, alloy properties, bending, joining and installation hints.

We can't guarantee how long the supply will last. To be sure of getting your free copy, why not clip and mail the coupon now?

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TRENT TUBE COMPANY

A Subsidiary of Crucible Steel Company of America
GENERAL OFFICES: EAST TROY, WISCONSIN
MILLS: EAST TROY, WIS.; FULLERTON, CALIF.

Trent Tube Company
East Troy, Wisconsin

Please send me a copy of your new tubing handbook.

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Address_____

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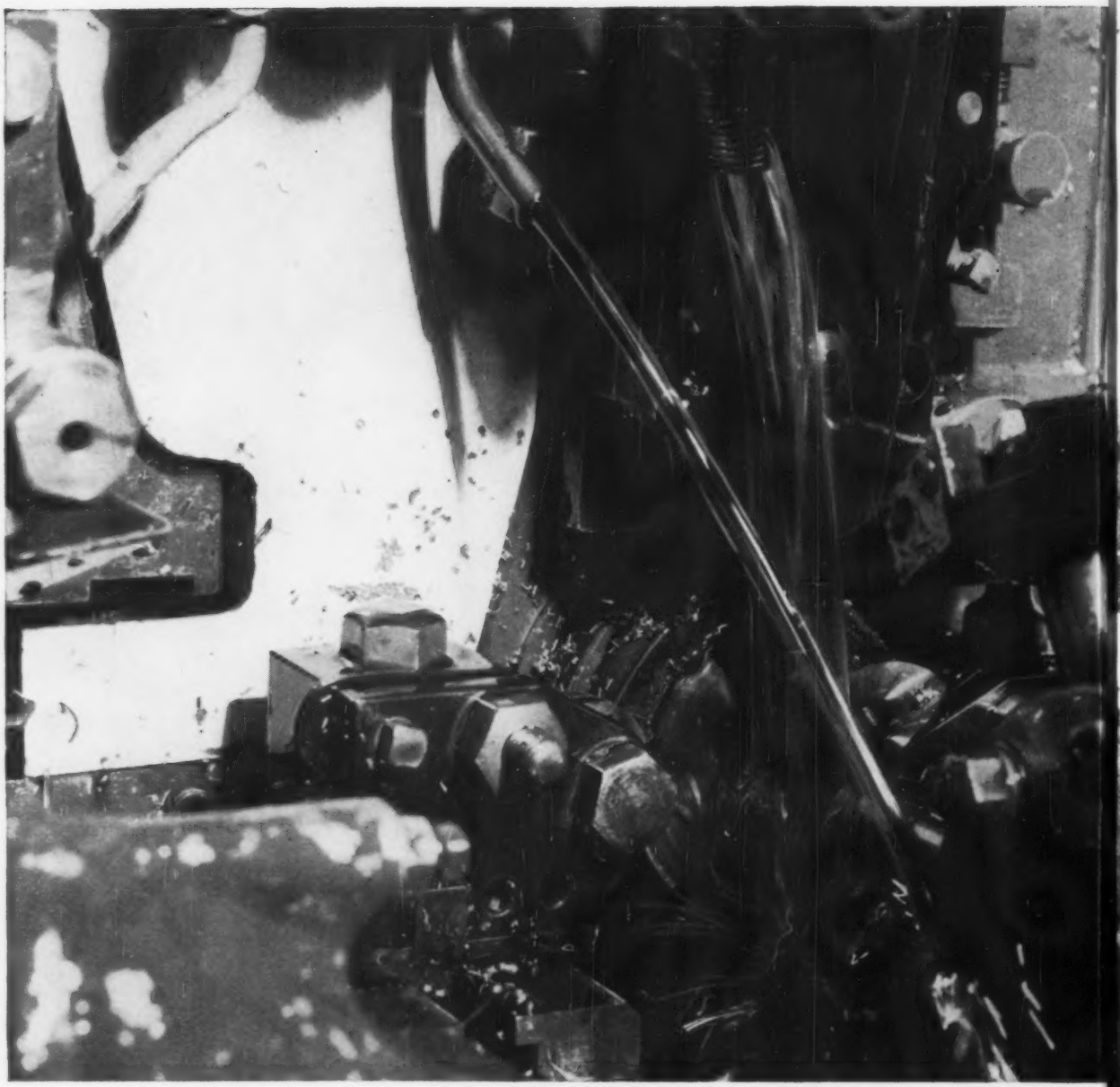


Holds tolerances of .0005 on stainless steel . . . cuts time

GULF MAKES THINGS

"Quite often we are required to hold to tolerances of .0005 on stainless steel in both automatic and hand screw machines," reports Wallace J. Perzanoski, Foreman of the Screw Machine Department, Cramer Controls Corporation, Centerbrook, Connecticut.

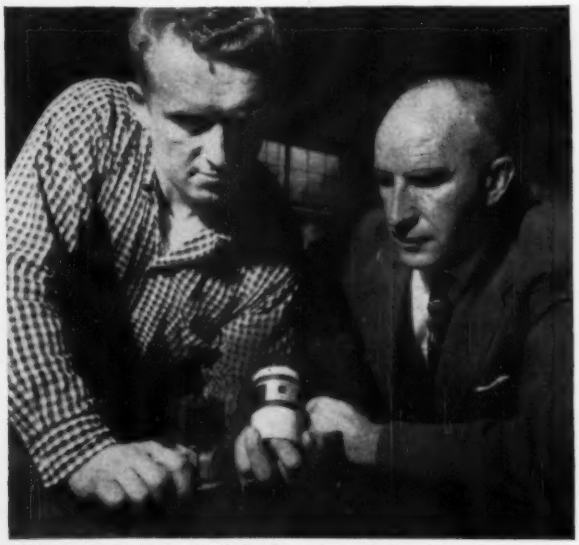
"The two cutting oils we now use . . . Gulfcut 41C for stainless steel and bronze, and Gulfcut 31A for regular brass and cold rolled steel . . . help us hold to critical tolerances. Moreover, we have shortened the time cycle on some jobs by 25 per cent," he added.

Cramer makes synchronous timing motors and precision electrical timers for commercial, industrial and military uses. Cramer's line of internal timers, time delay relays and others must meet the most critical specifications for structural and operating accuracy.

A typical precision job at Cramer is the machining of pinion posts for hermetically sealed timers which must meet rigid military specifications. Machining—on a Brown & Sharpe automatic—includes feed, rough turn, finish turn, form, cutoff and slotting.

Several years ago, Mr. Perzanoski's department was using 7 or 8 different cutting oils. After consultation

Precision machined pinion posts made by Cramer for Type 430H hermetically sealed timers. Piece is of 303 stainless steel, ½ inch long. Machining time 25 seconds per piece. Gulfcut 41C helps speed up this operation.



Wallace J. Perzanoski, left, Foreman of Cramer's Screw Machine Department, checks a timer part with B. F. Kimball, Gulf Sales Engineer. Gulfcut Cutting Oils help Mr. Perzanoski get finer finishes, closer tolerances, at higher speeds.

cycle 25% using Gulfcut . . .

RUN BETTER!

with a Gulf Sales Engineer, they reduced this to two Gulfcut oils, 41C and 31A. These two versatile oils serve for their complete range of tough machining jobs.

"Another feature of these Gulfcut Cutting Oils that our operators appreciate is the non-staining characteristic which makes them easier and cleaner to work with," said Mr. Perzanoski.

How about *your* cutting oil performance? See how Gulf makes things run better in your operation. Just call the Gulf Sales Engineer at your nearest Gulf office, or mail the coupon.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

Send me more information on:
☐ Gulfcut "Regular" Cutting Oils
☐ Gulfcut Heavy Duty Soluble Oils

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AIR FREIGHT EXCLUSIVE

Radar keeps deliveries on time—another United Air Lines "extra" at no extra cost

United, as the only coast-to-coast airline with all-fleet radar, can promise you unmatched delivery performance and a smoother ride for fragile shipments. Whether your shipment goes by DC-6A Cargoliner or one of the 900-plus daily passenger flights, on-time schedule dependability is improved by radar, a feature customers appreciate.

AND MORE "EXTRAS"

Reserved Air Freight guarantees you space aboard any United flight on as little as three hours' notice.

Personalized service – a follow-through feature, monitors your shipment from origin to destination.

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Centralized cargo control insures that there'll be space on the flight you want when you want it.

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Tells how United Air Lines saves shippers money, provides better service. How about you? Just write to Cargo Sales Division, United Air Lines, 36 So. Wabash Avenue, Chicago 3, Illinois.

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Plan Your Steel Insurance Now

With steel supply tightening up again and the possibility of a real scarcity in the months to come, it's nice to have your orders for plain and fabricated steel in the hands of a reliable and well-supplied organization.

Steel buyers everywhere know Levinson's reputation for having steel on hand . . . and for "fabrication that fits."

just . . . Leave it to **LEVINSON**

Warehousers, fabricators, designers of steel for over half a century

the **LEVINSON STEEL COMPANY**

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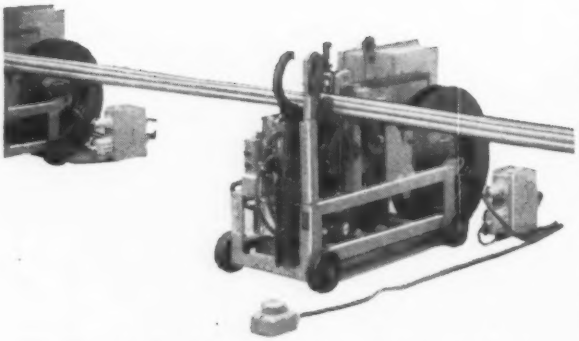
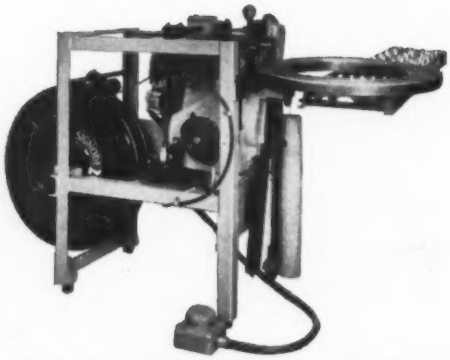
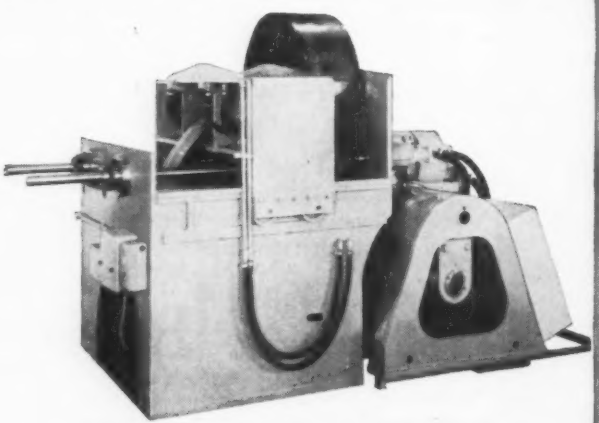
...proved in 73



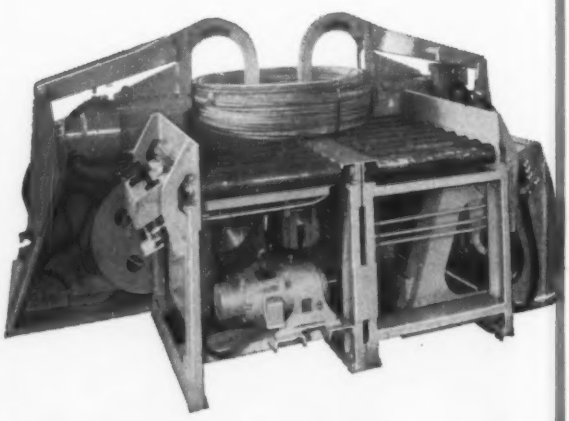
Signode MS2-B automatic strapping machines are used to bundle conduit, rods, tubing, and small dimension pipe. Usually two or three of these machines are used in line and operated from one control to apply two or three straps simultaneously. MS2-B automatic strapping machines can be adapted to handle and strap bundles of various shapes and sizes. Strapping operation is completed in four seconds.



The M2V machine straps narrow strip coils from ¼" to 2" wide. Each strap is applied in approximately 1½ seconds. Automatic and semi-automatic machines of the M2 series have been in steel mill operation since 1946, strapping conduit, rods, tubing, pipes, strip coils, mine roof bolts, and nail cartons.

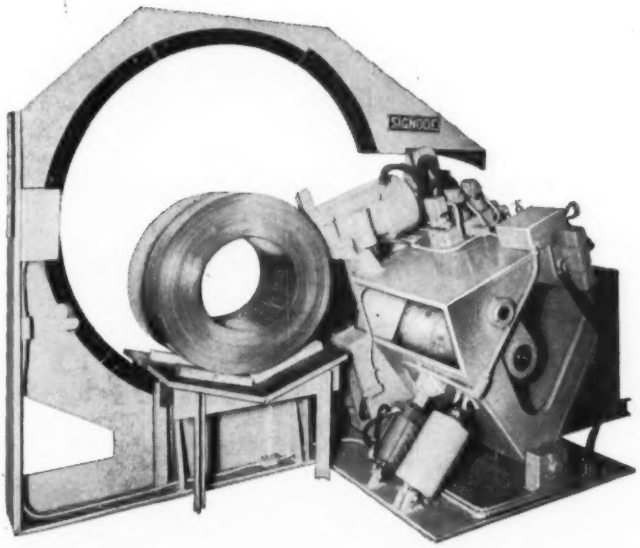


This MH10 series strip coil strapping machine will strap up to 120 coils per hour, three straps per coil. At the touch of a button, the machine tightens outer loops of the coil, squares up edges, positions the coil, and applies the strap to a pre-determined tension of up to 1200 pounds. Similar Signode machines have been in steel mill service since 1948...perform as well on hot coils—1200°F.



This dual automatic MH11 series strapping machine straps rod or wire coils up to 60" O.D. at 110 coils per hour. Machine applies single strap or applies two straps at once. Proper preset tension on every strap makes coils more compact, easier to handle, take less space. Signode wire coil strapping machines have been in steel mill service since 1949.

dependable steel mills



The Signode MH14-34 circumferential strapping machine is a relatively recent development. It automatically, and without adjustment for size, center-straps coils of from 30" to 60" O.D. Capacity is 300 to 400 coils per hour, depending on size. Coils can move through the machine in either direction.

SIGNODE machines reduce strapping and handling costs

The high cost of down-time in a steel mill puts a premium on machine dependability. Signode steel strapping machines have proved dependable—and productive—in 73 mills, some since 1946, in the hardest kind of service. Today's rising steel production gives additional importance to the savings these dependable machines deliver. Look to Signode for strapping machines built to steel mill standards.

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2623 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
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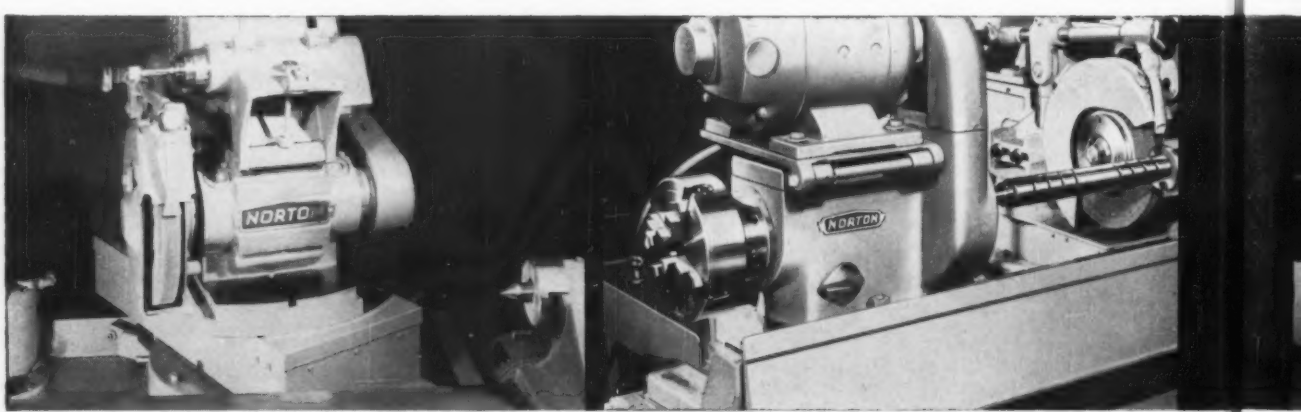
With fast change-over features like these...

Norton Universal Grinders

do more...save more



The flexible grinding wheel head swivels above and below the slideways, permitting independent angular settings of wheel and feed — giving you the widest job range.

You can change from dead center to chucking work with minimum effort. Chuck remains mounted at back end of headstock when grinding "on centers".

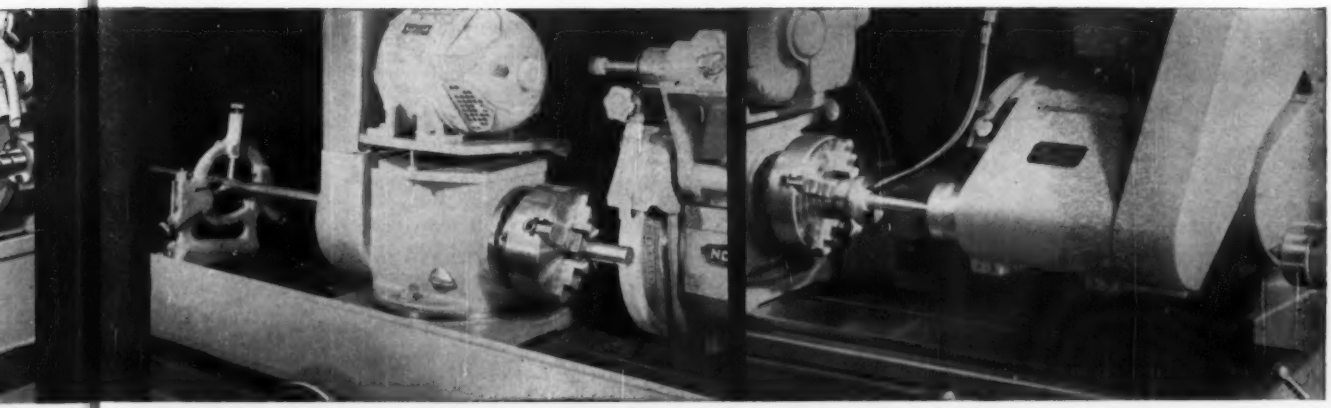
A Norton 12″ Type U-4 Universal Grinder, available with 36″ or 48″ nominal lengths between centers, typical of Norton Universals.

Install any Norton Universal Grinder and you've got a practically complete grinding department — for faster external, internal, face, taper and angular wheelslide grinding, including many special jobs. That's because Norton builds exceptional versatility into all these famous universals, with time-and-money-saving "Touch of Gold" advantages like the following:

Extremely rapid chucking . . . quick change-over to live or dead spindle operation . . . wide range of easily changed work speeds . . . independent wheel and feed settings for doing difficult jobs fast . . . extra capacities in wheel head and headstock . . . precise swivel table alignment with the SWIVALIGN* *Dual Electric Indicator and semiautomatic plunge feed arrangement optional extras.*

Engineered for long service life in handling so many different jobs, Norton Universal Grinders are easy to operate and maintain. Their swing capacities range from 10″ to 18″. Your Norton Sales Engineer, a trained expert in the grinding field, will be glad to help you select the size you need — and to give you an accurate estimate of what this grinder can do for you. NORTON COMPANY, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries



Hollow headstock spindle gives you additional capacity for grinding long bars by passing them clear through and supporting them in grinding position.

Hinged-bracket type internal grinding spindle swings up and out of the way when not in use. This means quicker set-ups for your I.D. or O.D. grinding.

NORTON

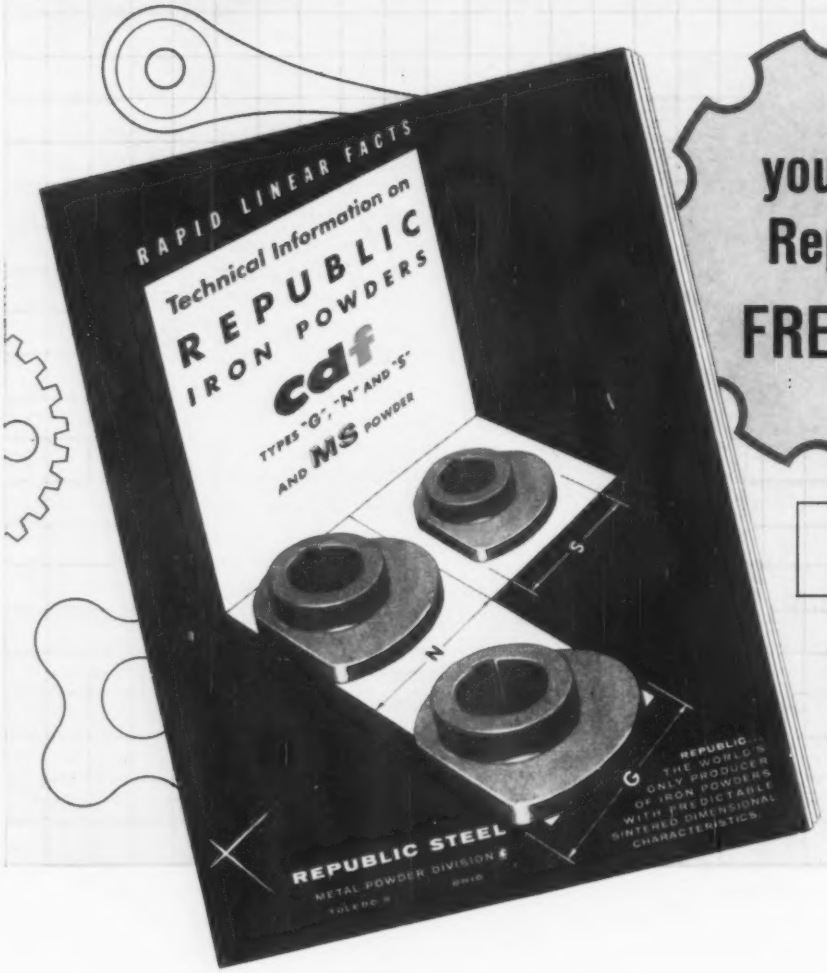
GRINDERS and LAPPERS

Making better products

...to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

If you design or fabricate iron powder parts...



you'll want Republic's FREE BOOK

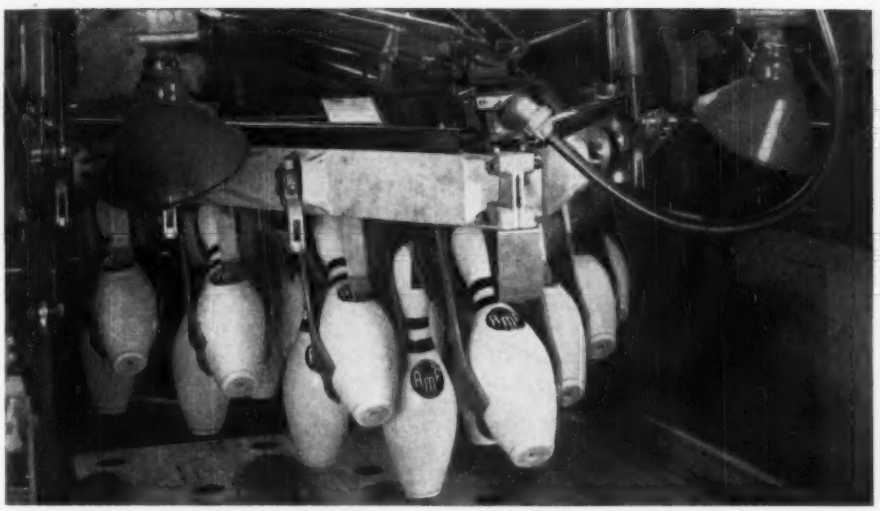
This new 48-page book has been prepared especially for tool engineers, part designers, metallurgists, and fabricators. It contains complete technical data on Republic's improved Controlled Dimensional Factor Powders and new MS Powder.

Data are presented by an entirely new method. Most of the necessary information regarding a particular powder's behavior can be read from the curves on a single set of ordinates.

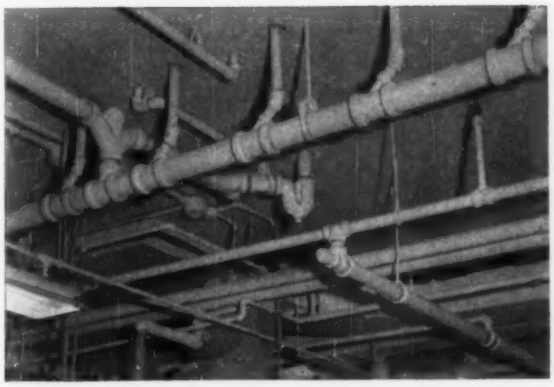
The first section of the book lists complete specifications for Republic's CDF Powders, Type "G" for growth, Type "N" for normal, Type "S" for shrinkage. Each of these powders has been improved with regard to compressibility, dimensional characteristics, and increased tensile strengths.

Section two provides complete information on Republic's new MS Powder, developed principally for use with graphite rather than copper. MS possesses features which make it economically attractive for use in a wide variety of mechanical parts, and in electrical and magnetic applications.

Mail the coupon for your free copy of Republic's new Iron Powder Book, ADV. 1014.



AMF CUTS COSTS, builds a better pinspotter with Republic ELECTRUNITE® Mechanical Tubing. On the initial order, ELECTRUNITE saved American Machine & Foundry Company, Brooklyn, New York, $34,000 in manufacturing their famous AMF Automatic Pinspotter. AMF was able to eliminate boring and grinding operations because ELECTRUNITE met O.D. tolerance requirements. This feature resulted in a savings of $15,000 in fabricating operations. Another $19,000 was saved on the cost of ELECTRUNITE as compared with tubing previously used. In uniformity, quality, original costs, Republic ELECTRUNITE Mechanical Tubing can save you time and money, too. Call Republic, or mail coupon for facts.



GOOD PERFORMANCE PLUS ECONOMY provided by Republic Steel Pipe make it ideal for a wide range of industrial piping applications. Illustration shows steel pipe used for steam, air, waste, and sprinkler system lines. Beyond low cost and long life, Republic Steel Pipe permits fast, economical installation. Because each length of Republic Pipe is uniform in strength, ductility, and wall thickness, operations including cutting, threading, bending, and welding are simplified. For complete information on types, sizes, and specifications, contact your nearest Republic Pipe Distributor. Or send coupon.

REPUBLIC MANUFACTURERS' COARSE WIRE to meet every production need. Box Binding and Stapling, Brush Handle, Chain, Garment Hanger are only a few of the qualities regularly produced. Large tonnages are shipped to manufacturers of fan guards, wire partitions, concrete reinforcing specialties, plated shelves, racks and grilles, and numerous other products. Republic wire metallurgists are available to help you in solving production problems. Write today.

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Roll Forming Equipment—Product dependability—integrity of manufacture—engineering for specific production needs have all contributed to establish Yoder equipment as the industry standard of excellence. Since 1909 Yoder-built machinery, including Pipe and Tube Mills, Roll Forming Equipment and Rotary Slitters, have earned world-wide customer satisfaction and recognition. Profit from Yoder's years of engineering and service experience. Send today for the illustrated Yoder Roll Forming Equipment Book.

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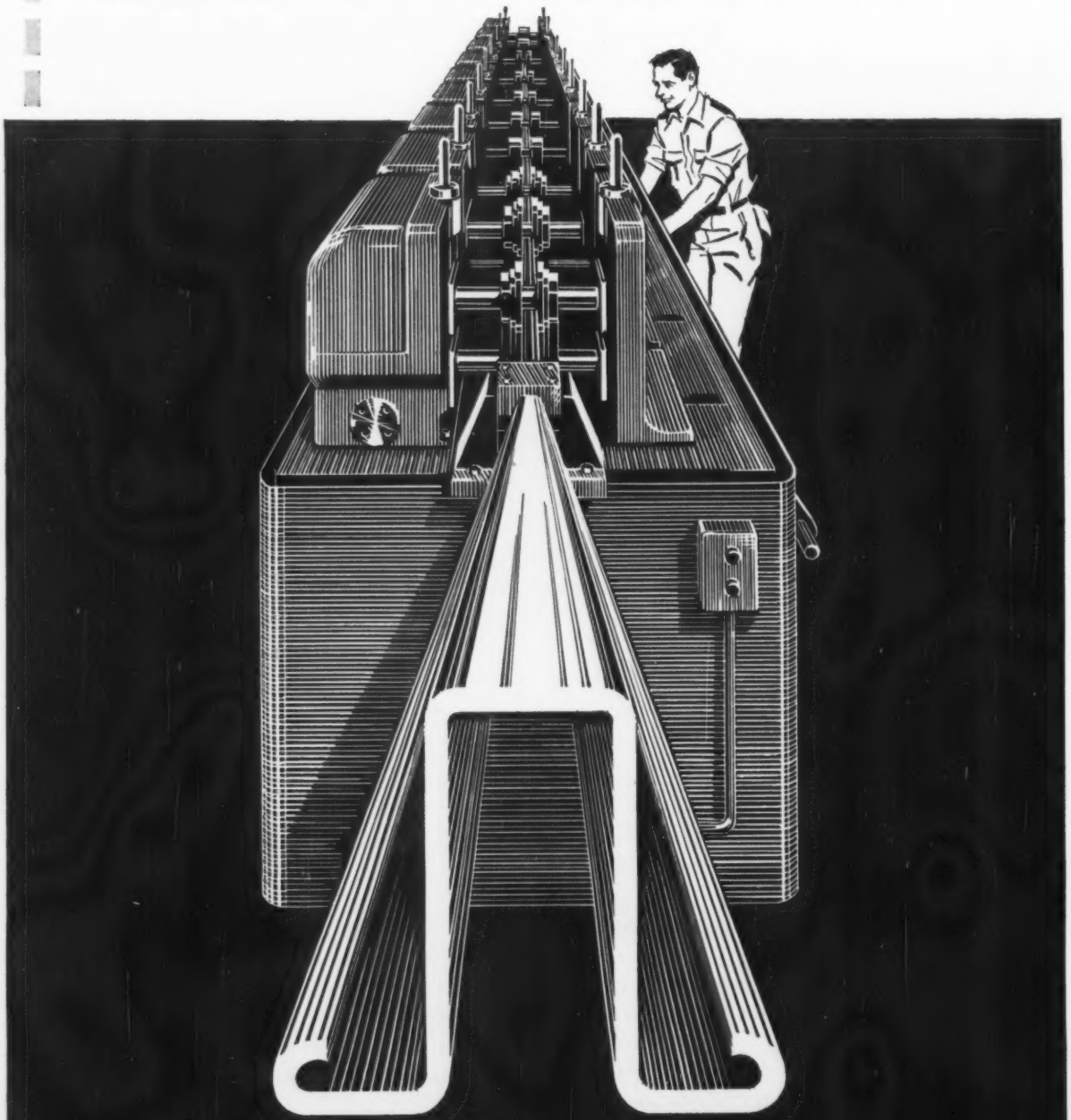

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PIPE AND TUBE MILLS (ferrous or non-ferrous)
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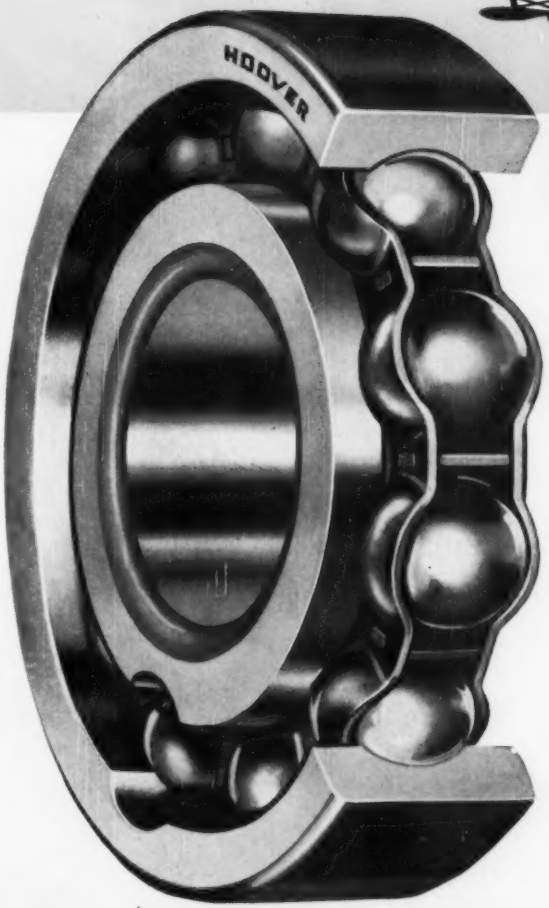
"SUPER MAX"



Maximum Capacity Ball Bearings of Outstanding Quality

Hoover has designed "Super Max" bearings to provide the greatest radial capacity that can be efficiently obtained in a single row ball bearing. These durable bearings utilize the maximum number of extra-large-size balls that can be introduced into the bearing, giving optimum load-carrying ability. In addition, the smoothness of *Hoover Honed* raceways and the perfect matching of *Micro-Velvet* balls, accurate within millionths of an inch, contribute to exceptional load-carrying capacity.

Hoover "Super Max" bearings are recommended for applications requiring extended life under relatively heavy radial loads. They are available in open and shielded types, with or without snap ring, to meet maximum capacity requirements.

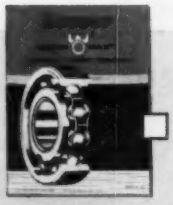
Hoover Honed, *Micro-Velvet* and "*Super Max*" are Hoover trademarks.

hoover

BALL AND BEARING COMPANY

5400 South State Road, Ann Arbor, Michigan

Los Angeles Sales Office and Warehouse:
2020 South Figueroa, Los Angeles 7, California



FREE LITERATURE

Check the information you want.

☐ BULLETIN 107 gives complete data on "Super Max" bearings.

☐ HOOVER HANDI-BOOK of Anti-Friction Bearings outlines bearing types, problems, applications.

IA-3

Hoover Ball and Bearing Company
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ONE SOLVENT — TWO JOBS

Now you can use one grade of trichlor for both...Nialk trichlor with **psp**

Now you take trichlor for missile flushing and vapor degreasing out of the same drum.

The *metal degreasing* grade of Nialk® trichlorethylene meets industrial specs for flushing missile and rocket components. Its residue count is a low 0.0005%. It meets impact sensitivity requirements.

Save storage space. You can cut inventory to the bone with this single grade of trichlor. The savings in time and money are obvious.

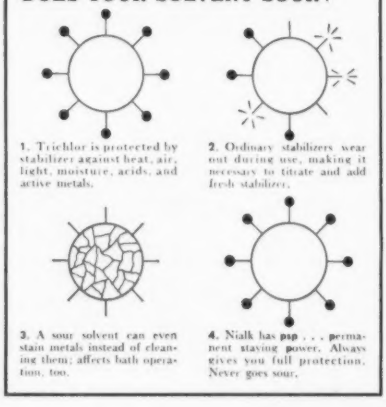
Eliminate mistakes. There's no chance of picking the wrong drum to do a job when you stock just one grade for all work.

No disposal problems. Take the same trichlor you use for flushing and you can use it in your vapor degreaser without distilling.

Get psp too. Get the extra advantages of **psp**—**p**ermanent **s**taying **p**ower—in your trichlor. See box at right for details.

Send for bulletin. Data Sheet 814 should answer any questions you have about Nialk trichlor. Write for a copy.

DOES YOUR SOLVENT SOUR?



1. Trichlor is protected by stabilizer against heat, air, light, moisture, acids, and active metals.

2. Ordinary stabilizers wear out during use, making it necessary to titrate and add fresh stabilizer.

3. A sour solvent can even stain metals instead of cleaning them; affects bath operation, too.

4. Nialk has **psp** . . . permanent staying power. Always gives you full protection. Never goes sour.

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HOOKER CHEMICALS PLASTICS

How GENERAL STEEL CASTINGS can improve product design and performance

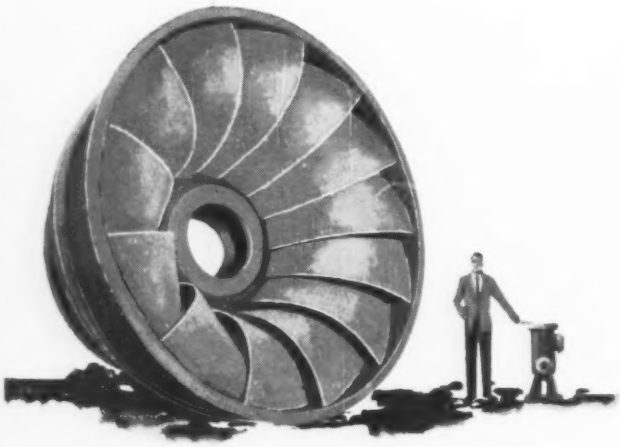
The demands of progress in today's industrial economy impose exacting new operating and service standards upon "capital goods" machinery and equipment. To build into their products the stamina necessary to meet these requirements, more and more manufacturers are taking advantage of the superior properties inherent in steel castings.

The great freedom of metal distribution possible in steel castings results in a maximum strength-to-weight ratio, compactness, flexibility of design details, high shock resistance, and long service life. The full advantages steel castings have to offer in your product, however, can be gained only through the experienced application of a wide range of services.

General Steel has pioneered for more than 50 years in providing to industry a complete service, ranging from design through production, for cast steel structures and steel castings used in cast-weld and composite structures. Today the company serves a wide variety of industries in the United States and many foreign countries. Now, with a continuing expansion program, General Steel offers this complete service to additional manufacturers who seek to keep pace with industrial progress by increasing the value, performance, and engineering economies in their products.

where industrial progress is cast in steel....

NOW...take advantage of this complete service to meet your specialized requirements

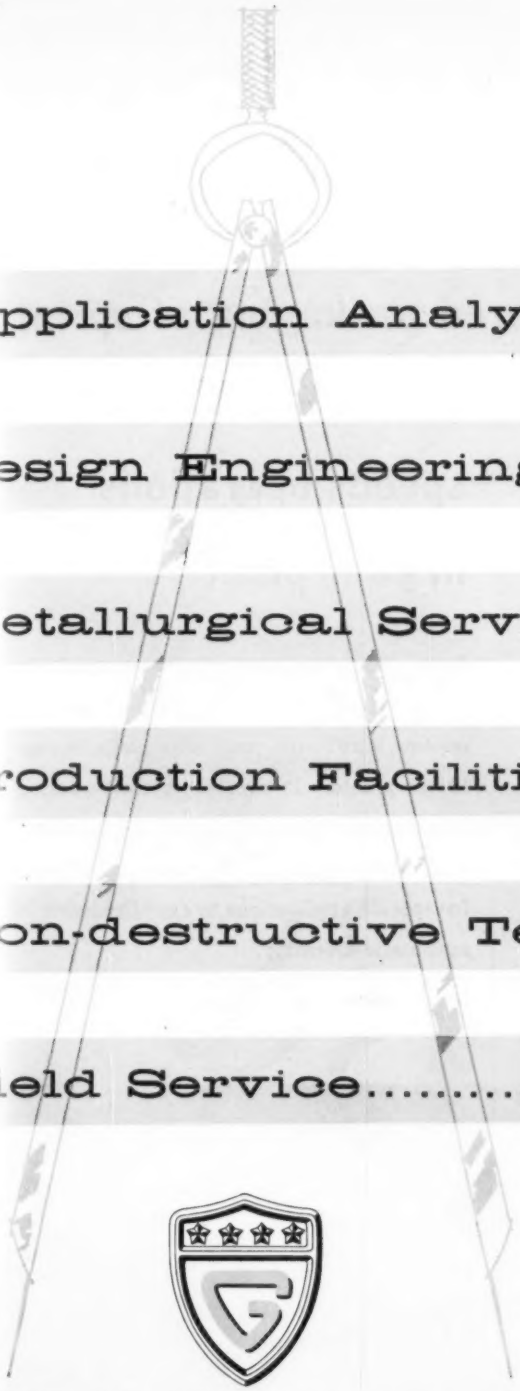


From concept to casting, General Steel offers a complete service . . . a unique blending of research and development, creative design, quality production, and follow-through in the field.

In two strategically located plants General Steel has the space, facilities and staffs to plan, develop and engineer structures to meet your specialized requirements. We are equipped to work from your specifications . . . or simply with "raw ideas". We prefer to work with you from the start, for it is in this kind of teamwork that our skills most successfully complement your own.

General Steel's Granite City Plant in the St. Louis Industrial Area includes 127 acres, 37 of which are under roof, and has a capacity of about 4000 tons of finished castings monthly.

General Steel's Eddystone Plant in the Philadelphia Industrial Area includes 112 acres with 20 under roof, and has a monthly capacity of approximately 3000 tons of finished industrial castings.



Application Analysis.....

Sales, Engineering, and Manufacturing personnel evaluate your products' structural requirements and work with you to determine the most advantageous applications of steel castings.

Design Engineering.....

Creative teamwork between your staff and our engineers brings many specialized talents together to develop optimum structural design.

Metallurgical Service.....

Experienced staffs and fully equipped laboratories provide up-to-date metallurgical counsel in addition to close manufacturing control of materials.

Production Facilities.....

Two plant areas, exclusive of our National Roll and Foundry Division, have experienced personnel and complete facilities for producing machined castings ranging in size from 100 pounds to 100 tons.

Non-destructive Testing.

Radiographic, magnetic particle and ultrasonic inspection equipment together with specialized personnel assure compliance with the most exacting quality standards.

Field Service.....

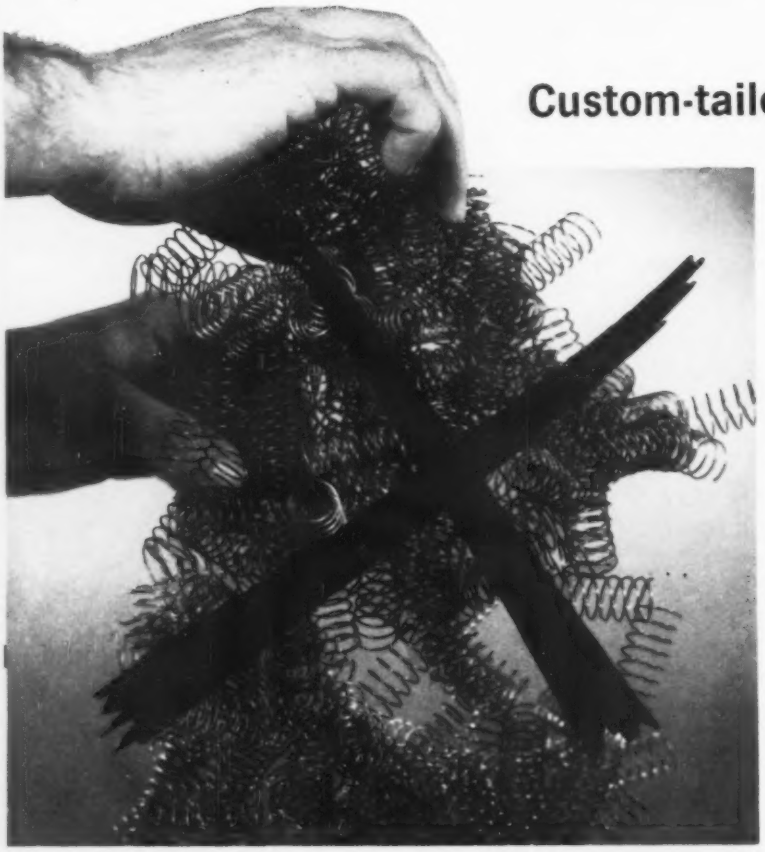
Follow-through in the field by specialized personnel from all departments of the company insures that all structural performance requirements are met.

LET US CONSULT WITH YOU ON YOUR PRESENT PRODUCTS ...AND FUTURE PROJECTS. CALL US IN NOW.

GENERAL STEEL CASTINGS

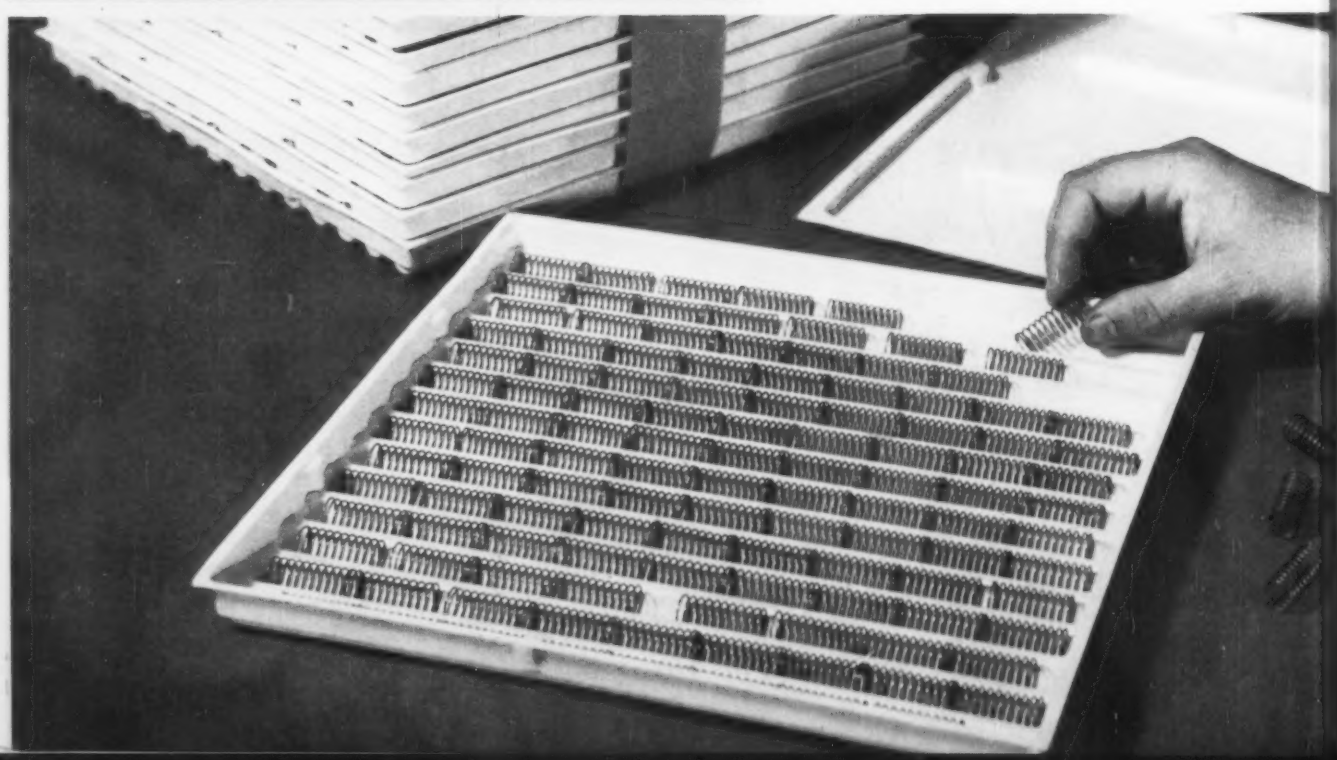
GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.

NEW... Spring Flow®



Custom-tailored packaging of springs that cuts costs and speeds operations in your plant

Spring Flow is a systematic approach to the problems of handling and storage of springs, wire forms, small stampings, in customer plants. It overcomes time-wasting tangling, and the distortion that often results from tangling. It can be engineered for specific applications to expedite hand or automatic assembly.



Spring Flow lowers handling and assembly costs — eliminates distortion — protects finish

Spring Flow makes use of a variety of modern materials, dispensers, containers. The extent to which it may be applied depends on the complexity of each individual part and handling requirements. The cost of Spring Flow is frequently offset by resulting savings

The potential benefits of Spring Flow almost defy imagination. Ask for a Spring Flow proposal for your springs or other fabricated-metal products. Or find out more about this exclusive service by writing for the new booklet—"Spring Flow."

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B-G-R Division, Plymouth and Ann Arbor, Mich.
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Lincoln

WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS

ATLAS SOLVES HIGH COST PROBLEMS

High welding costs were eating away at profits and making it tougher to bid competitively on heavy fabricating jobs at the Atlas Machine and Iron Works in Arlington, Va.

Werner Quasebarth, production manager and his brother, Bill Quasebarth, plant engineer, decided immediate action had to be taken. Since most of the work coming out of their shop is welded, it was natural that their welding operations come under scrutiny first.

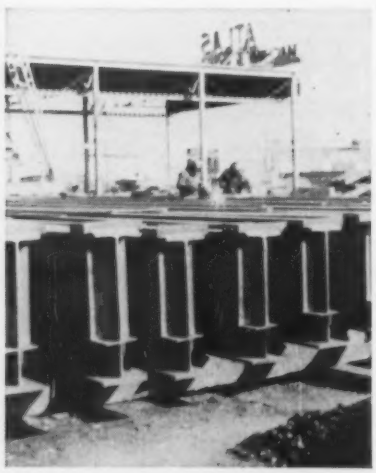
To help them analyze all their welding procedures and processes they asked Jim Clauson, a welding engineer from Lincoln, to conduct a survey of their shop in an effort to pinpoint inefficiencies.

Bill Quasebarth and Jim Clauson checked every welding operation in the shop. They compared electrodes and processes for operating factor, speed, weld quality and appearance. As a result of the survey several improvements were made which are expected to pay off in cost reductions of ⅓ or more.

Bill Quasebarth, Plant Engineer, found the way to cut costs and improve the product.

The most dramatic improvement was made on the process for welding cover plates on girders. Welding manually, Atlas welders have been able to complete 12 actual feet of $\frac{5}{16}$" fillet welds per manhour. By utilizing two Lincoln Mechanized "Squirt" welders which are capable of welding 50 feet of $\frac{5}{16}$" fillet per machine hour, Atlas was able to increase overall production 50% on this operation.

Bridge bearings are welded manually with iron-powder Jetweld electrodes.



Welding cover plates on bridge girders. A switch to semi-automatic has upped production 50%, improved weld quality.

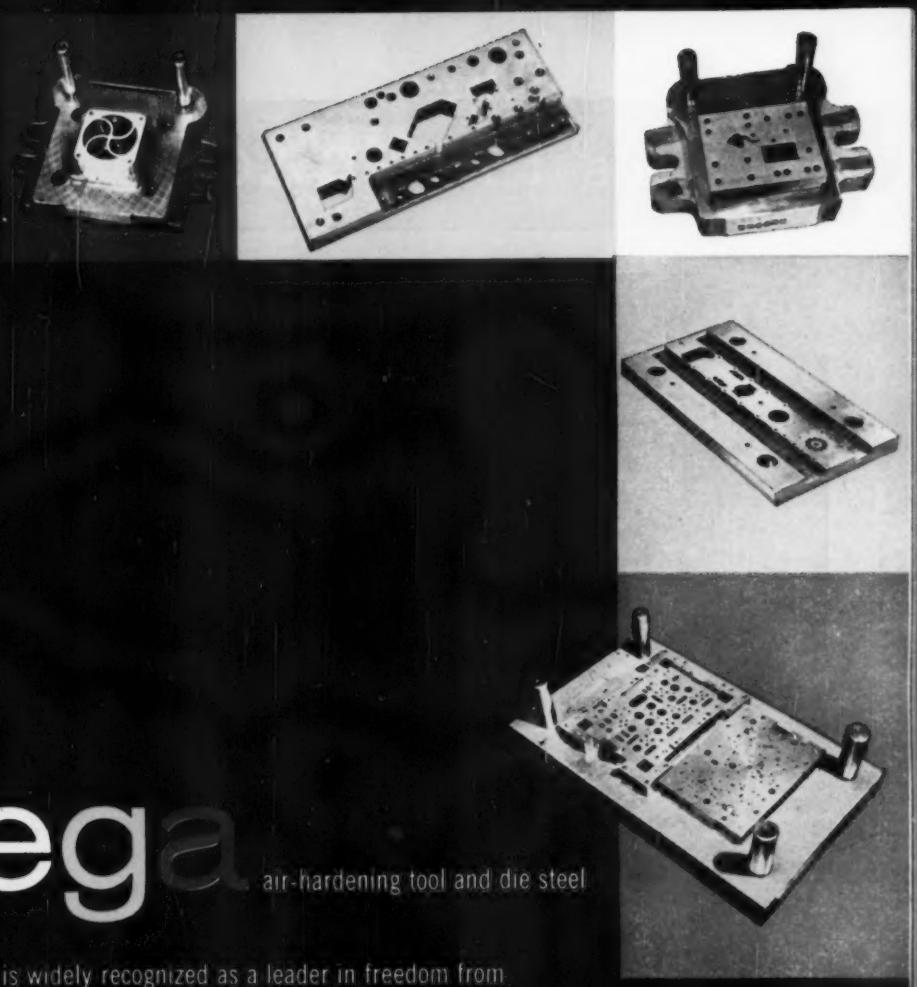
For short welds, not accessible to the semi-automatic or automatic machines, iron-powder Jetweld electrodes were found to offer greater speed, higher operating factor and better welds.

Werner Quasebarth says, "We're grateful to Lincoln for helping us with our cost problems. We've learned from experience that the advice of Lincoln engineers is sound. We've been skeptical in the past, but we've found the Lincoln man is usually right."

THE LINCOLN ELECTRIC COMPANY

Dept. 1551 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment



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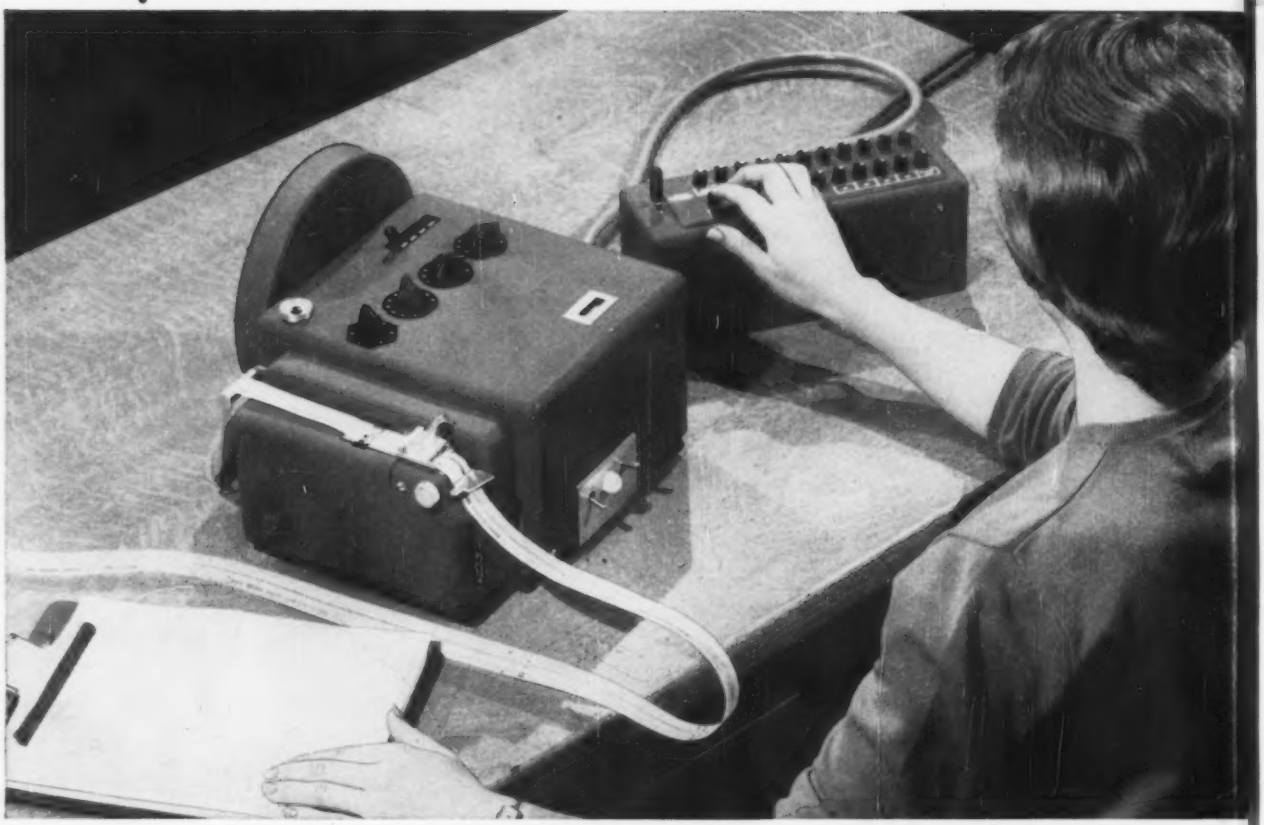
air-hardening tool and die steel

is widely recognized as a leader in freedom from size change and distortion. No other steel has such a job-proved record of succeeding where other grades have failed. VEGA was specially developed by Carpenter to combine toughness and the machining properties of an oil-hardening steel with the safety in hardening of an air-hardening grade. We'll gladly prove the facts. Call your local Carpenter SERVICE-CENTER. Complete stocks assure you immediate delivery

the *Carpenter* Steel Company, Reading, Pa.

Here's the PRACTICAL* approach

POTTER & JOHNSTON



***SIMPLE** . . . to understand, operate and maintain.

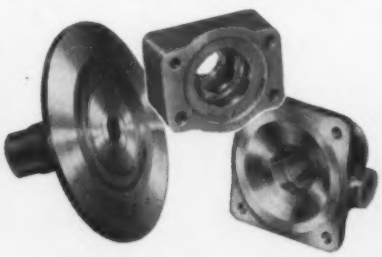
***LOW COST** . . . priced far below other tape control systems.

***SAVES TIME**...as much as 25%.

PREPARING THE INITIAL TAPE TAKES LESS THAN 30 MINUTES . . . for the average job, and preparation is readily handled by any clerical or other non-technical employee. Since the tape is easily stored for re-use, additional time is saved on every repeat run. Using a simple code table, a "program chart" is first prepared from the regular operation sheet. No mathematical computations or conversions are involved. Following the coded data on the program chart, the tape is then punched, using the compact tape preparation unit. This is equipped with easily set dials for moving the tape to the correct address points . . . and clearly marked buttons that are pressed to punch all necessary machine commands into the tape.

ALL PROGRAMMING SETUP TIME IS ELIMINATED . . . by simply placing the tape in the machine's tape reader —which takes only a couple of minutes. Unusually compact, the controls are installed as part of the machine and occupy no additional floor space.

PARTS ARE COMPLETED IN MINIMUM TIME . . . under tape control, because the entire machining cycle is programmed by the Engineering Department instead of the setup man. As a result, machine spends *more* time cutting metal, *less* time "cutting air."

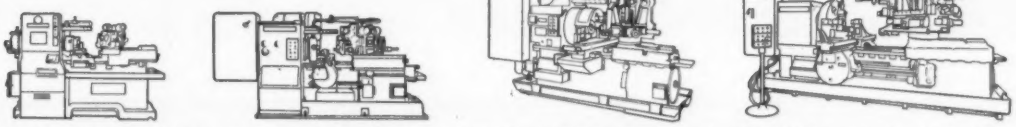


to Automatic Machine Programming

TAPE CONTROL

Potter & Johnston Tape Control is a unique new type of control system that makes the advantages of automatic programming available on a practical, economically realistic basis. The very low initial cost of $3,500.00 is possible, because of its simplicity. It is not electronic, and therefore requires no tubes or transistors. Unlike other systems, P&J Tape Control can be easily added to current models of Potter & Johnston Automatics already in the field, in addition to being available on new machines.

Operating under the P&J Tape Control System, all motions of the machine's spindle, turret and cross slides—including all speed and feed changes—are controlled by a quickly prepared plastic tape. As a result of the increased efficiency made possible by this system, a manufacturer using a P&J Tape Controlled Automatic in regular production has already reported savings of 25% in machining and setup time. In addition, the cost-cutting benefits of automatic machining are now made available for many production runs involving 25 pieces or less.

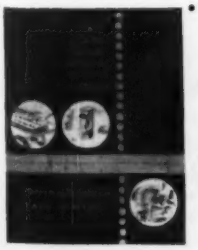


. . . . AUTOMATIC TURRET LATHES WITH CHUCK SIZES FROM 6 INCHES TO 42 INCHES . . . .

POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898



YOU'LL FIND ALL THE TIME-SAVING FACTS . . .

on P&J Tape Control in this new circular. Use the coupon here to send for your free copy. See for yourself how this unique system can provide the practical, simple answer to your profit-building, cost-cutting requirements. Potter & Johnston Company, Pawtucket, Rhode Island

POTTER & JOHNSTON Company, Pawtucket, R. I.

Please send my free copy of Bulletin No. 176 fully describing P&J Tape Control for Automatic Turret Lathes.

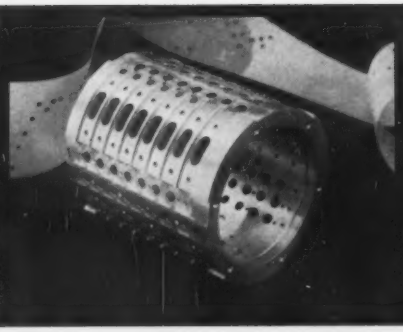
NAME_____ POSITION_____

COMPANY_____

CO. ADDRESS_____

CITY_____ ZONE_____ STATE_____

ACCURACY



MACHINING TIME WAS CUT 50% for 10-piece lots of these gear boxes, by changing from manual to tape control. Locations made automatically under tape control are accurate to .0001".

30-HOUR JOB DONE IN 7½, when this precision computer part was machined under Numerical Control. This job involved precision machining at 566 separate locations.

1429 HOLES WITHOUT ERROR, an almost impossible job under manual operation, was completed under Pratt & Whitney Numerical Control with estimated time savings of 41%.

ASSURED...

"P&W NUMERICAL CONTROL HAS PROVED IT WILL IMPROVE **MACHINE UTILIZATION*** 100% AND ELIMINATE ERRORS," says "Jake" Jaeger

** (Time spent cutting metal)*

Mr. J. J. ("Jake") Jaeger, Vice President and Chief Engineer of Pratt & Whitney's Machine Tool Division, states, "Reports from more than 35 successful installations in the field and experience in our own manufacturing conclusively prove that P&W Jig Borers with Numerical Control represent a truly significant advance in metalworking. Users, which include both the giant corporations and shops with less than 10 men, are realizing time savings from 2-to-1 to 6-to-1 – depending on the complexity of the parts – and in addition have improved their MACHINE UTILIZATION time 100%. With this great increase in productivity, the jig borer has truly become a production machine. Used, for example, in our own manufacturing of components, the need for expensive jigs is eliminated, engineering changes are simple and inexpensive – and every production part has the toolroom precision of an original jig.

ADDITIONAL ECONOMIES THROUGH SCRAP ELIMINATION . . .

"With all machine positioning made automatically under Numerical Control, scrap losses from human errors in positioning are eliminated. Freed from blueprint calculating, the operator can concentrate on his primary job – making chips. The result is more and better work, with less fatigue.

VERSATILITY UNLIMITED

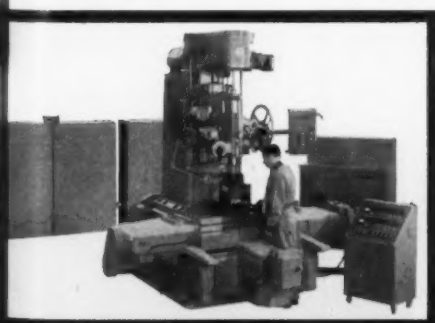
"The P&W Jig Borer has also proved that it can handle efficiently and economically an almost unlimited variety of jobs – one-piece jobs, extremely complex jobs, or lot production – in fact, any job that requires drilling, reaming, tapping or boring holes, or milling slots or surfaces."

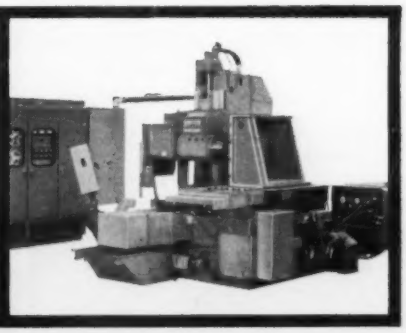
Summing up the importance of Numerical Control, "Jake" Jaeger continues, "No one can *afford* to overlook the ability of this equipment to increase machine tool utilization and effect economies in his own operations." Experience has proved the truth of this statement, so act today to get all the facts on P&W Numerical Control. Write now for your free copy of Circular No. 609. Pratt & Whitney Company, Inc., 10 Charter Oak Boulevard, West Hartford, Conn.

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS





AUTOMATICALLY POSITIONING WORK ACCURATE TO .0001", the P&W Numerically Controlled Jig Borer combines toolroom precision with production-line speed and economy.

SETTINGS ACCURATE TO 5 SECONDS OF ARC are made automatically by the P&W Rotary Table with Numerical Control. Automatic positioning speeds work, eliminates human errors.

PROFILE MILLING ENTIRELY UNDER TAPE CONTROL, the P&W Numeric-Keller produces irregular shapes without the need for any template or model. Accuracy is unusually high.

NOW IT'S
UNION CARBIDE METALS C

Production Plus: A dependable supply of ferroalloys and metals is assured from six modern plants (three with their own power facilities) and seventeen warehouses.

Product Variety: More than 100 top-quality ELECTROMET brand ferroalloys and metals are available from Company plants such as this at Marietta, Ohio.

Research: The Metals Research Laboratories at Niagara Falls, N.Y. is one of the largest metallurgical research and development centers in the world.

Customer Service: Some of the country's best-qualified specialists in the proper us of alloying materials provide technica service to customers.

S COMPANY

Known for over 50 years as
ELECTRO METALLURGICAL COMPANY,
we have changed our name to Union Carbide Metals Company. This name will reflect more accurately the close association of this Division with Union Carbide Corporation.

This is a change in name only. The products, the people, and the earnest desire to serve you remain the same.

Our metals laboratories with a 500-man team of metallurgists, engineers, and technicians are carrying out extensive research and development programs in ferroalloys, pure metals, and metal chemicals. Technical assistance and other specialized services are available from our competent metallurgical staff. In addition, Union Carbide Metals Company is backed by the diversified resources of all the other divisions of Union Carbide Corporation. These are only a few of the many reasons why you will continue to get more for your money when you buy the familiar ELECTROMET brand products.

PRODUCTS OF UNION CARBIDE METALS COMPANY INCLUDE

Electromet **Ferroalloys and Metals: Boron, calcium, chromium, columbium, manganese, silicon, tantalum, titanium, tungsten, vanadium, and zirconium. Also metal chemicals and metal compounds.**

UNION CARBIDE METALS

Electromet **Brand Ferroalloys and other Metallurgical Products**

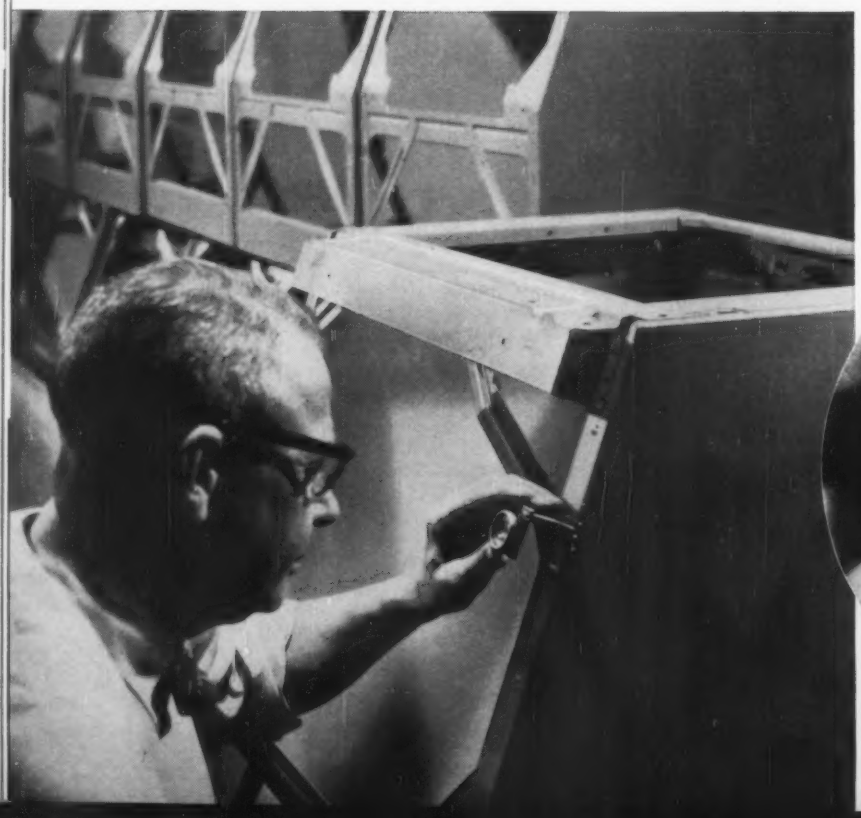
UNION CARBIDE METALS COMPANY
Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

"Electromet" and "Union Carbide" are registered trade marks of Union Carbide Corporation.

Pittsburgh Steel's patterned sheet gives leather-appearance to the new custom furniture-styled L-1000 Laundromats shown here on way to final inspection.

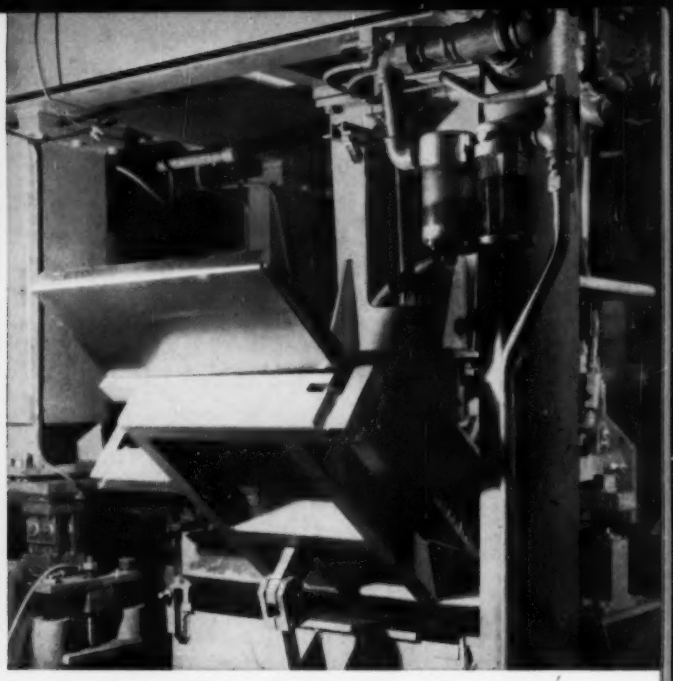
An Industry First . . .

Pittsburgh Steel Has Beauty of Leather On Westinghouse 'Furniture-Styled Twins'



Soft, rich finish on a group of Laundromat shells is checked at one of the many quality inspection points. Close-up shows detail of the L-1000's pattern.

Fully as formable as Pittsburgh Steel's regular plain sheets, the new patterned sheets are put through Westinghouse's normal production process at Mansfield, Ohio.



Top quality in sheet, plain or patterned, is needed to serve Westinghouse's automated equipment. Here, patterned sheet is formed into the shell of the L-1000.

First time pattern-rolled steel available in wide steel sheets

Wide patterned sheet steel—a new product and a Pittsburgh Steel Company "first"—has been put to work by Westinghouse Electric Corporation on its new line of custom "furniture-styled" appliances.

Wider than any patterned sheet available until now, the new sheet is designed and finished to appear like fine-grain leather. It's being used as the outer shell on Westinghouse's newly introduced L-1000 Laundromats and D-1000 automatic electric dryers.

Pittsburgh Steel's Allenport (Pa.) Works is the steel industry's first producer of patterned, flat-rolled carbon steel in widths up to 48 inches—about twice the width previously available.

Patterned sheet is available in coils or cut lengths, in either commercial or drawing quality. As flat, formable and drawable as Pittsburgh Steel's plain sheet, super-wide pattern-rolled steel goes through Westinghouse's regular production process without special machine changes.

Patterned sheets are given 27 piercings and notchings, in addition to a four-side flange. At Westinghouse, the rolled-in pattern emerges unmarred, even on corners and bends.

Next step is welding and then the sheet is formed into the appliance's shell. After bonderizing, the shell gets a sprayed-on enamel coat which is baked. Soft wood-toned in color, the enamel helps emphasize the attractive, but rugged, leather-like finish.

• **Shape of Tomorrow**—But surface is only one quality standard Pittsburgh Steel meets. The Shape of Tomorrow theme in Westinghouse appliances requires clean, pronounced lines. As a result, bends and corners are sharper on the L-1000 and D-1000 models. This imposes extra requirements for uniformity of hardness so that the patterned sheets won't overbend or spring back.

Flatness specs must be met rigidly so that the finished appliance isn't plagued by an "oil-canning" effect.

Westinghouse has automated so much of its production sequence at the Mansfield, Ohio, plant that steel suppliers know gauge and dimension specs must be held rigidly. If they aren't, rejects and scrap losses would mount rapidly.

Pittsburgh Steel's patterned sheets are performing so well at Westinghouse and in other applications that a promising future is being predicted for the product, especially in the automotive, appliance and building industries.

Patterned sheets are suitable for any application where decorative appeal is needed, in addition to steel's strength, formability and economy.

Produced on one of the steel industry's most modern sheet mills, patterned sheet complements Pittsburgh Steel's full line of hot and cold-rolled carbon steel products.

Supplementing this product is cold-rolled strip steel produced by the Thomas Strip Division, Warren, Ohio, whose line also includes pattern-rolled strip—plain or with a variety of protective and decorative coatings. These include copper, brass, nickel and zinc.

If you are a manufacturer of a product made from flat-rolled steel, you can't afford to pass up potential improvements in your production process or the sales zip this imaginative patterned steel can give your product. Contact any of the district sales offices listed on this page.

Pittsburgh Steel Company

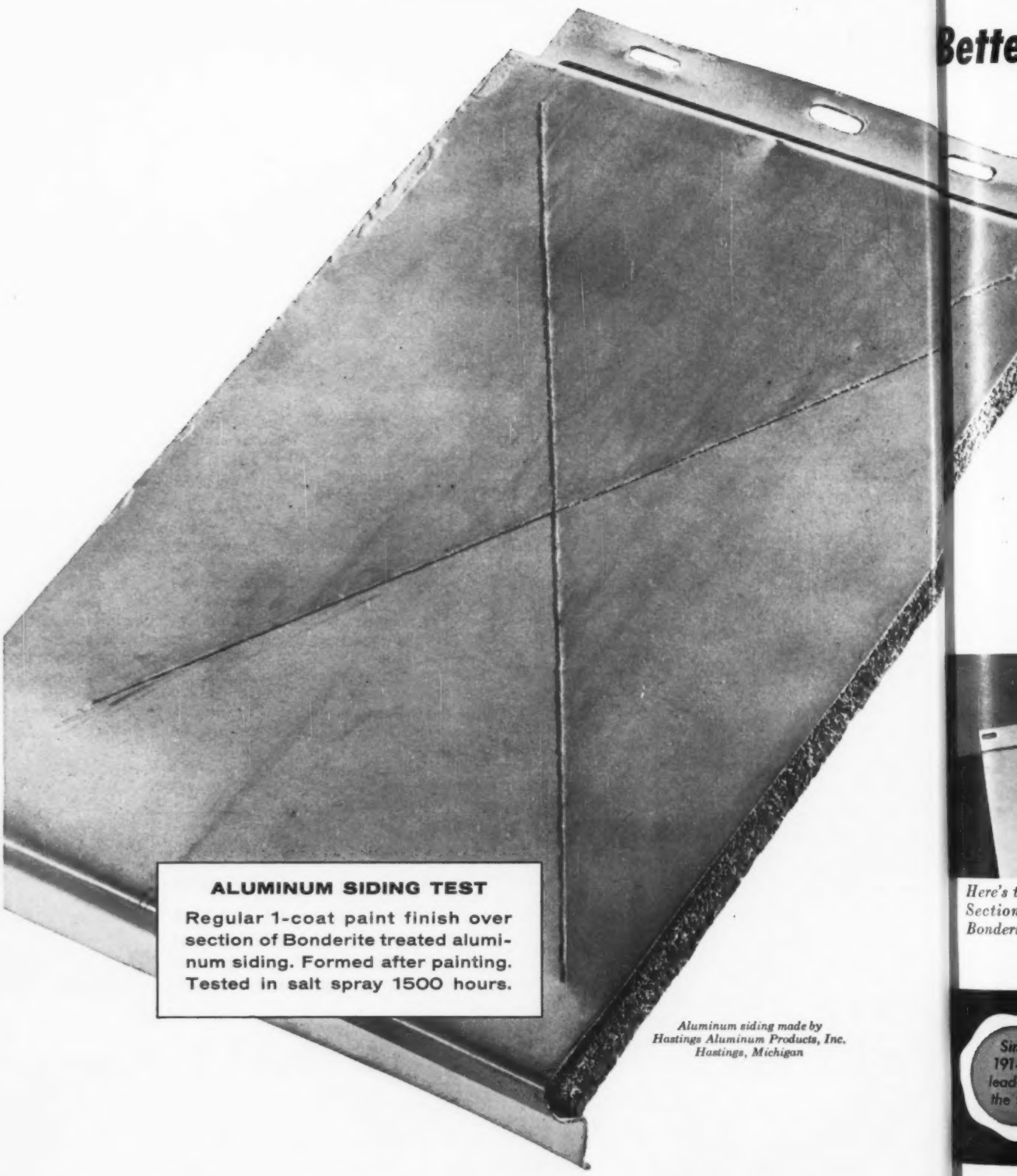
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

BONDERITE fo

Bette



ALUMINUM SIDING TEST

Regular 1-coat paint finish over section of Bonderite treated aluminum siding. Formed after painting. Tested in salt spray 1500 hours.

Aluminum siding made by Hastings Aluminum Products, Inc. Hastings, Michigan

E for ALUMINUM

Better paint adhesion...better corrosion control

In two hundred plants—many of them the leaders in their particular fields of aluminum fabrication—Bonderite for aluminum is being used today!

Bonderite makes it possible to take aluminum in the coil, run it through a continuous line in which the strip is cleaned, Bonderized, roll-coat painted, dried—and then recoiled.

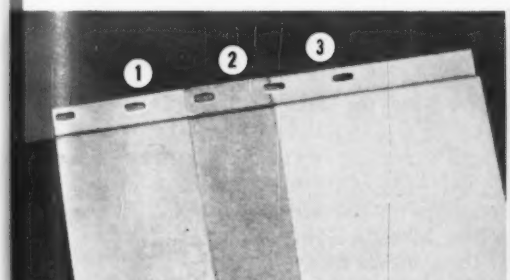
Because Bonderite gives paint such a secure foothold, it will stand severe forming operations (see photo below). With the Bonderite corrosion barrier at work, durability of the paint finish is almost indefinitely prolonged.

Bonderite meets and exceeds the requirements of Government Specification MIL-C-5541. Bare corrosion resistance is outstanding.

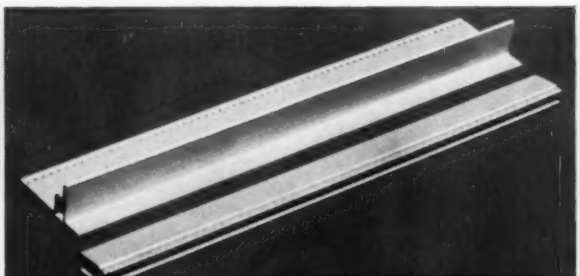
There's more than one type of Bonderite for aluminum. Besides the paint base, there's a Bonderite that creates a pleasant green coating, for use on architectural products. There's a Bonderite which protects without changing the characteristic color of the aluminum. Another Bonderite coats aluminum, steel and zinc—just the thing for mixed production.

There is a Bonderite, in fact, for every form of aluminum production, and for practically every alloy.

The big news in surface treatment for aluminum today is Bonderite! Let a Parker man tell you all about it!



Here's the 1-2-3 for durability of painted aluminum. Section of siding shows bare aluminum, (1); Bonderite treated, (2); and roll-coated paint, (3).



These aluminum window and screen frame sections were Bonderized and painted in the strip and formed after painting. There isn't a break in the finish anywhere!

Since 1914—leader in the field

PARKER RUST PROOF COMPANY
2197 E. Milwaukee, Detroit 11, Michigan
Tel: TRinity 5-3377

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

NEW

Heavy-Duty Torque Converter Trackmobile
- **switches, spots 'n' hauls freight cars at lowest cost**
- **pulls 4 loaded cars from a standing start**

5TM Trackmobile

MOVES MORE CARS–QUICKER, EASIER!

Here's robust power to switch, spot and haul freight cars. Energetic *new* 5TM Trackmobile quick-changes from road wheels to rail wheels and back again to put cars where they're needed—when needed. Built for day in, day out punishment, 5TM never says quit. Its hefty torque converter and engine mean muscle control at its smoothest — *gliding* strength to pull a string of loaded freight cars.

Production never lags when industry's toughest convertible is on the move and *moving*. And just like Models 3TM and 2TM "three moves a day make it pay." Ask for your copy of the new 5TM Trackmobile Bulletin now. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

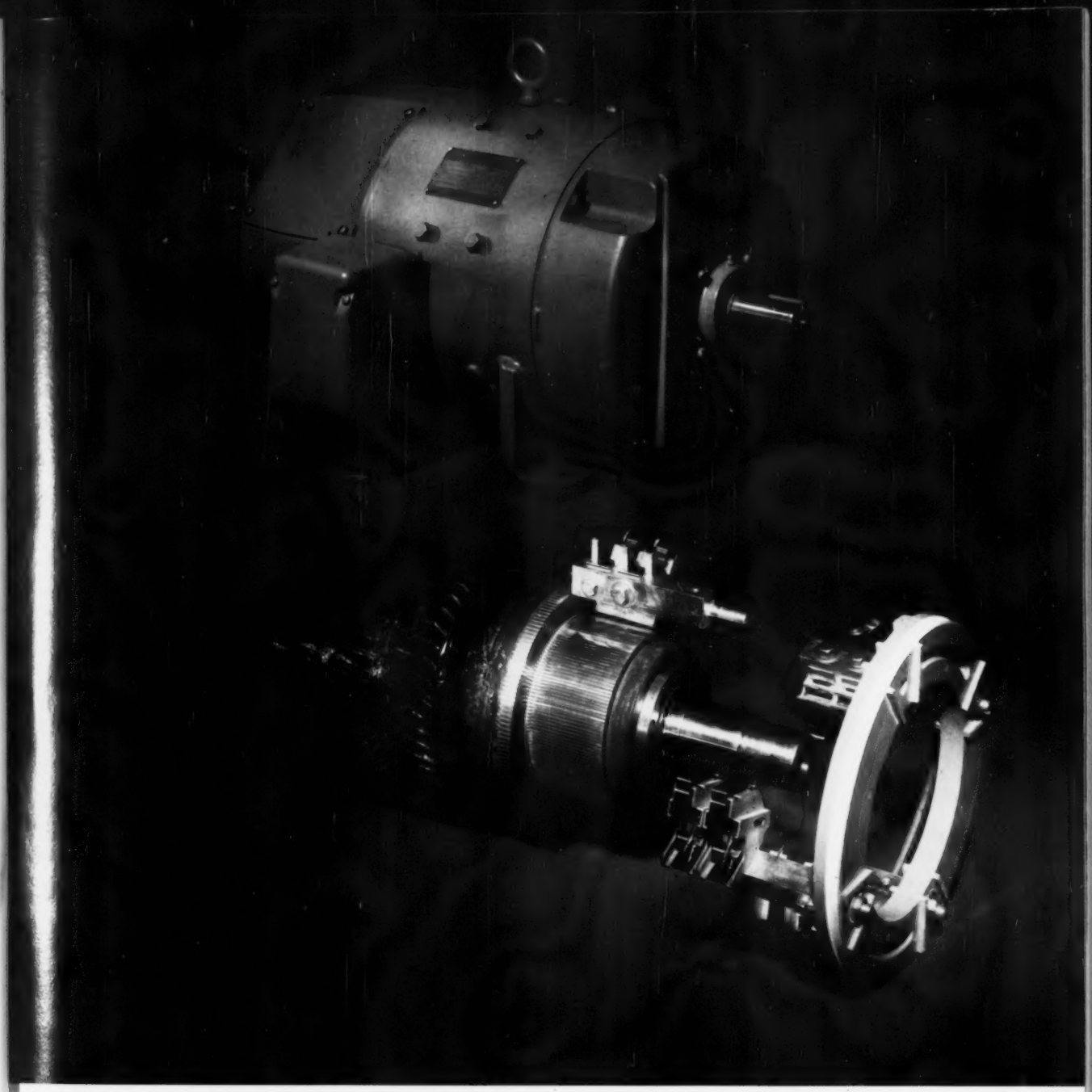
75th year

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

TRACKMOBILE

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILE; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT



NEW GENERAL ELECTRIC DC MOTOR GIVES

Extra Power To Meet Peak Loads

KINAMATIC* . . . *a new standard in industrial direct-current motors* . . . designed to meet the vital power load requirements of modern manufacturing methods.

Proper Design Balance . . . means unmatched commutating ability . . . the ability to deliver the short bursts of power required for quick acceleration and deceleration. Fewer turns per armature coil . . . full complement of commutating poles . . . maximum number of commutator segments, combine to permit higher peak loads.

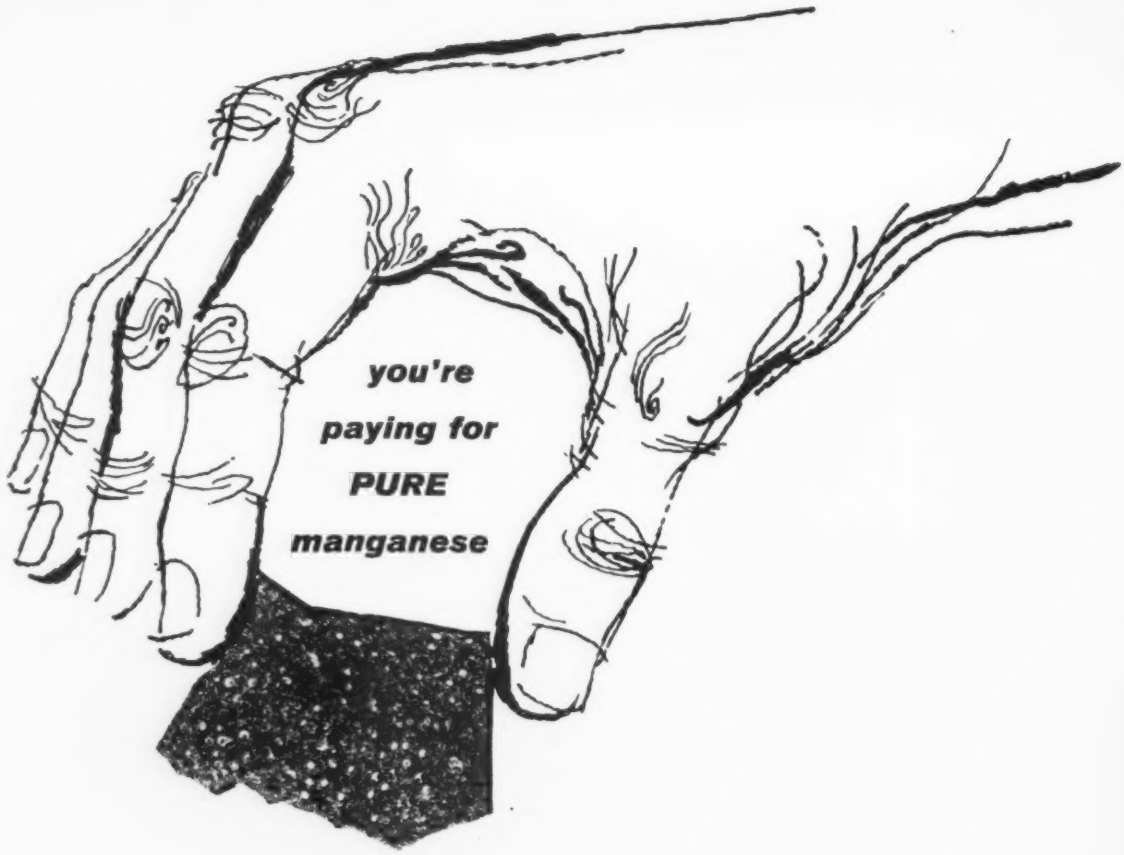
New Brush Assembly . . . constant-pressure brush springs eliminate brush adjustments. Bronze, corrosion-resistant brush holders are mounted on square steel studs for stable operation in both directions of rotation. Molded polyester-glass yoke resists impact, intense heat and corrosion.

D-c Kinamatic Motors offer a reliable key to successful automation. Additional information is available at your nearest General Electric Apparatus Sales Office. Or, if you prefer, write for Bulletin GEA-6355, *Direct Current Motor and Generator Department, Erie, Pennsylvania.*

*Trade-Mark of General Electric Company. 813-11

Progress Is Our Most Important Product

GENERAL ELECTRIC



. . . why not get it?

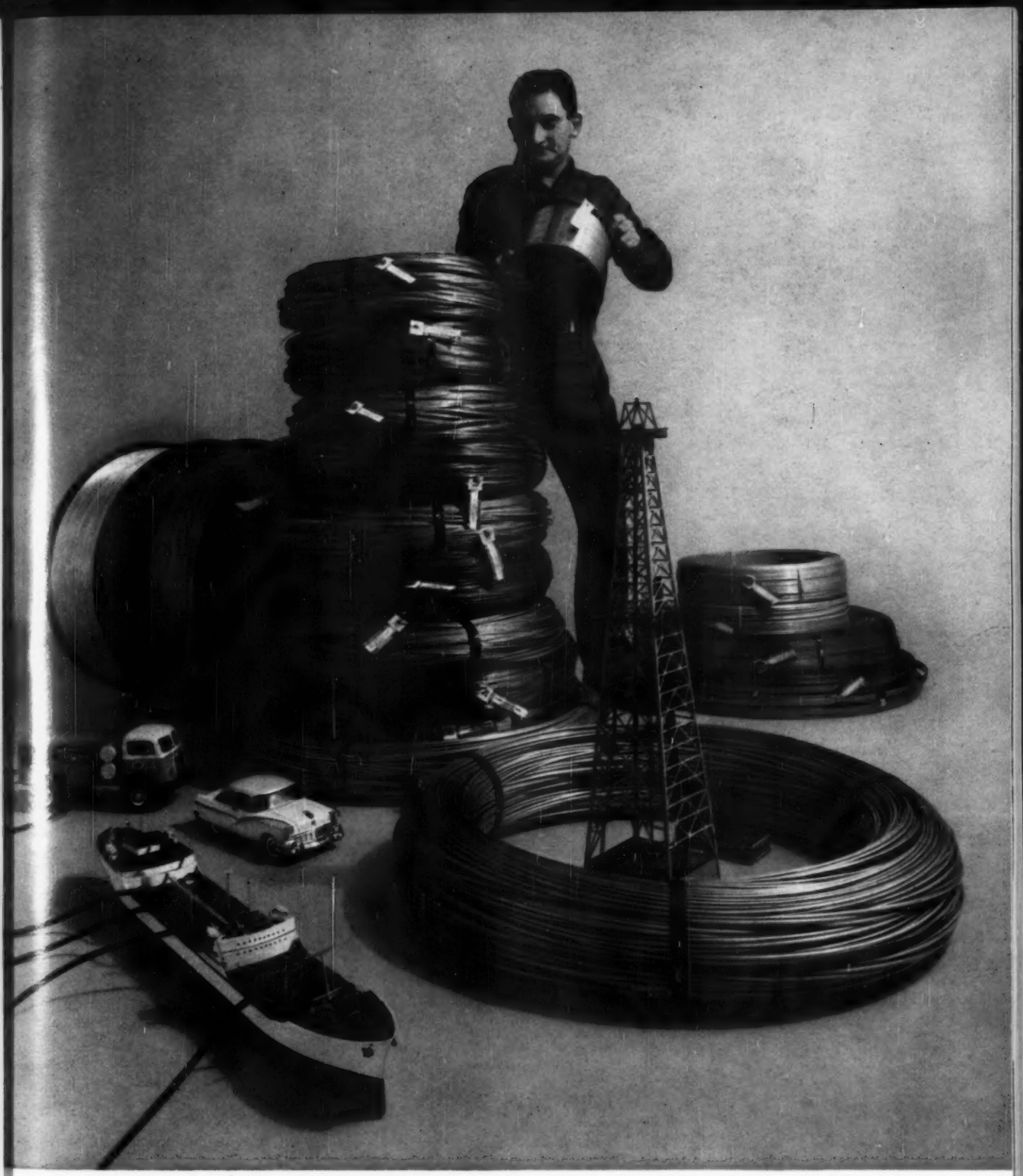
Put Foote's Electromanganese to the "what-do-I-get-for-my-money test." Apply the same test to manganese alloys. Then compare results.

Here's about what you can expect. *With Electromanganese* . . . you get manganese and *only* manganese, 99.9+% pure! There's no carbon, no silicon. And you end up with a better product. You gain and your customers gain. *With manganese alloys* . . . you get the manganese, all right, but you also get impurities that can be harmful to your steel making process—especially if you're making low carbon aluminum killed auto steels, stainless, or other steels where carbon and silicon control is critical.

Get the manganese you need in its *purest* form—Electromanganese. A Foote engineer is ready to tell you the whole story . . . help you work out what you might expect in your own plant. Until then, Bulletin 201 will give you more details on Electromanganese, the special Hydrogen-Removed Grade (H:7.5ppm), and Nitrided Grades. Write Technical Literature Department, Foote Mineral Company, 438 Eighteen W. Chelten Building, Philadelphia 44, Pennsylvania.

FOOTE MINERAL COMPANY

Electrolytic Manganese Metal • Nitrelmang • Hydrogen-Removed Electromanganese • Rimex Manganese Sulphide • Welding Grade Ferro Alloys • Commercial Minerals and Ores • Lithium Metal, Chemicals, Minerals • Zirconium, Titanium, Hafnium (Iodide Process)



Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

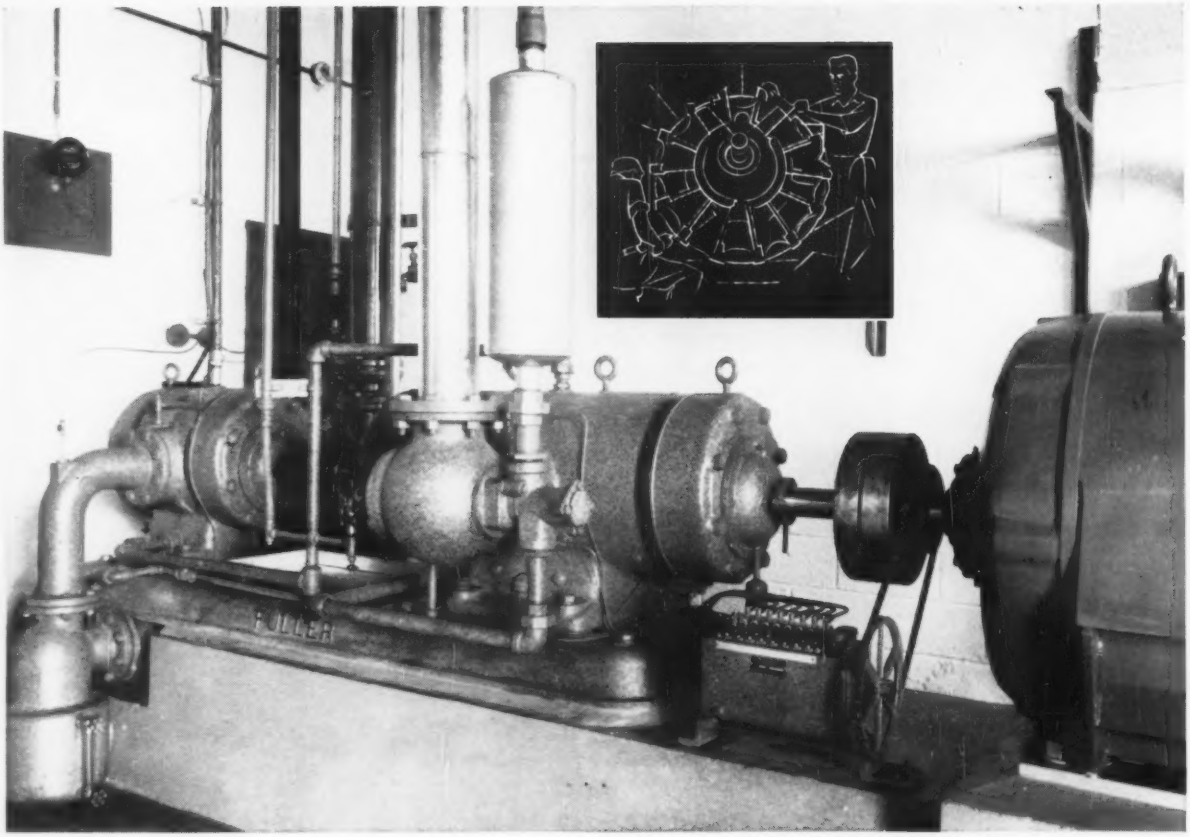
Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

Roebling...Your Product is Better for it

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



WHY DID AIRWORK SPECIFY A FULLER AIR COMPRESSOR?

Here's what the Vice President-Operations of Airwork Corporation, one of the nation's leading aircraft overhaul companies, writes about Fuller Model C-150-150H Rotary Air Compressors.

"We were running out of air capacity, and had decided that we would like to get rid of the maintenance problems inherent in a piston type air compressor.

"The Fuller compressor with its fewer moving parts and favorable price range met our basic requirements.

"We then checked on Fuller compressor performance through our close contacts with a leading manufacturer of aircraft engines. Their opinion was very favorable. We think Airwork has made the right decision."

Here are the features that sold Airwork on a Fuller Compressor:

- Wide seal between rotor and bottom of cylinder, assuring high volumetric efficiency.
- Rotary design assuring vibration-free flow of air.
- Direct drive.
- Compact space-saving installation.
- Simple foundation.
- No valves to leak or seats to grind.
- Few moving parts, keeping maintenance time to minimum.
- Designed for continuous duty service

When your plant needs reliable air power, call on Fuller. To get all the facts on Fuller Rotary Compressors for capacities up to 3300 C.F.M. and pressure to 125 pounds, write today.

Fuller

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY

C-323
4914

122 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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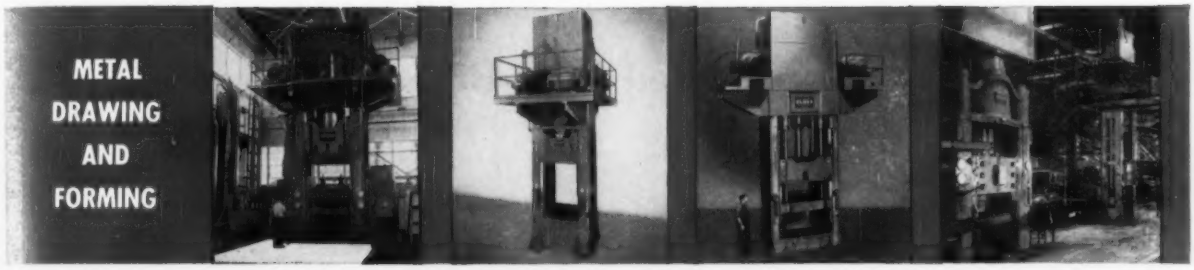
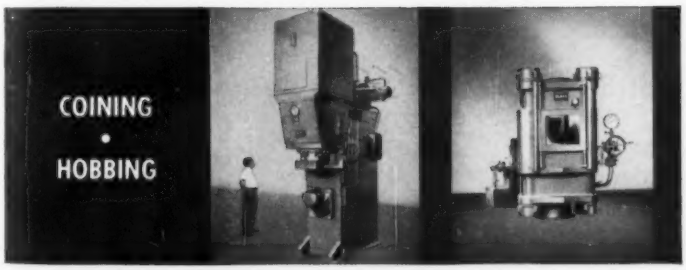
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

For YOU, too . . .

Elmes can turn pressing problems into profit-making performance!

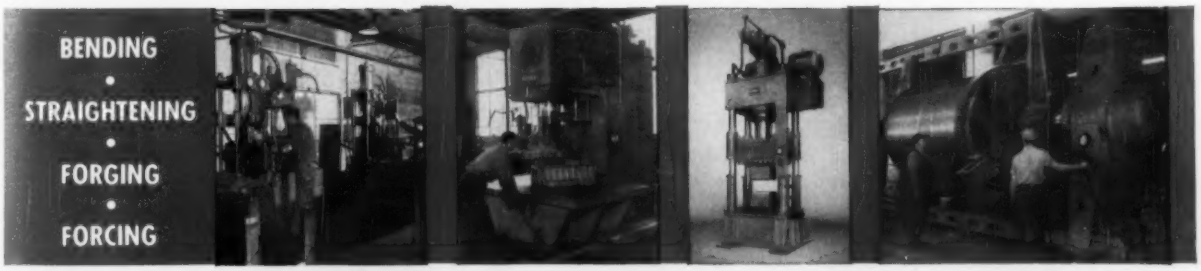




Elmes Engineering vision and know-how have provided hundreds of cost-reducing press installations like these during more than 60 years of leadership in specialized hydraulic service.

In some cases, a standard-design Elmes® Press met all the job needs. In others, simple modifications were made in the basic press design. In still others, a special "custom built" press was developed to meet unusual production requirements. But in every case the press was Elmes "Job-Fitted"—*the right press for the job.*

Elmes experience and ingenuity can bring the same profit-producing transformation into your shop. Talk it over with your Elmes Distributor, or write us direct.



Elmes American Steel Foundries
ENGINEERING DIVISION

1166 Tennessee Avenue, Cincinnati 29, Ohio

METAL-WORKING PRESSES • PLASTICS MOLDING PRESSES • PUMPS • ACCUMULATORS

From ROUGH BLANK to FINISHED GEAR *In 5 Seconds*

How? a New Red Ring Broaching Process

ACCURACY:

Pin size to .0009″

Lead to .0008″

Involute error .0003″

Composite error less than .001″

FLOOR–FLOOR: 15 Seconds

CHARACTERISTICS: 87 teeth, 24 pitch, 22° helix, 4″ O.D., ¾″ face—cast iron.

TOOL LIFE: After broaching 26,000 parts, this broach was resharpened by the removal of only .010″ of metal. In other cases, production would be governed by operating conditions.

REPLACES SIX HOBBING MACHINES

8168

The above are actual production figures showing the possibilities of this amazingly effective broaching process.

The consistent precision and speed attained do not depend on the operator. They are engineered into the tooling.

Investigate the savings of this process as applied to your operations. Get the whole story from a Red Ring engineer.

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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

TUBE DISTRIBUTORS BALANCED SERVICE

delivers steel tubing at no "premium price"!

Fact!... You cut production costs, warehousing and handling costs, minimize your steel tubing investment, and *pay no premium*, when you buy in warehouse quantities.

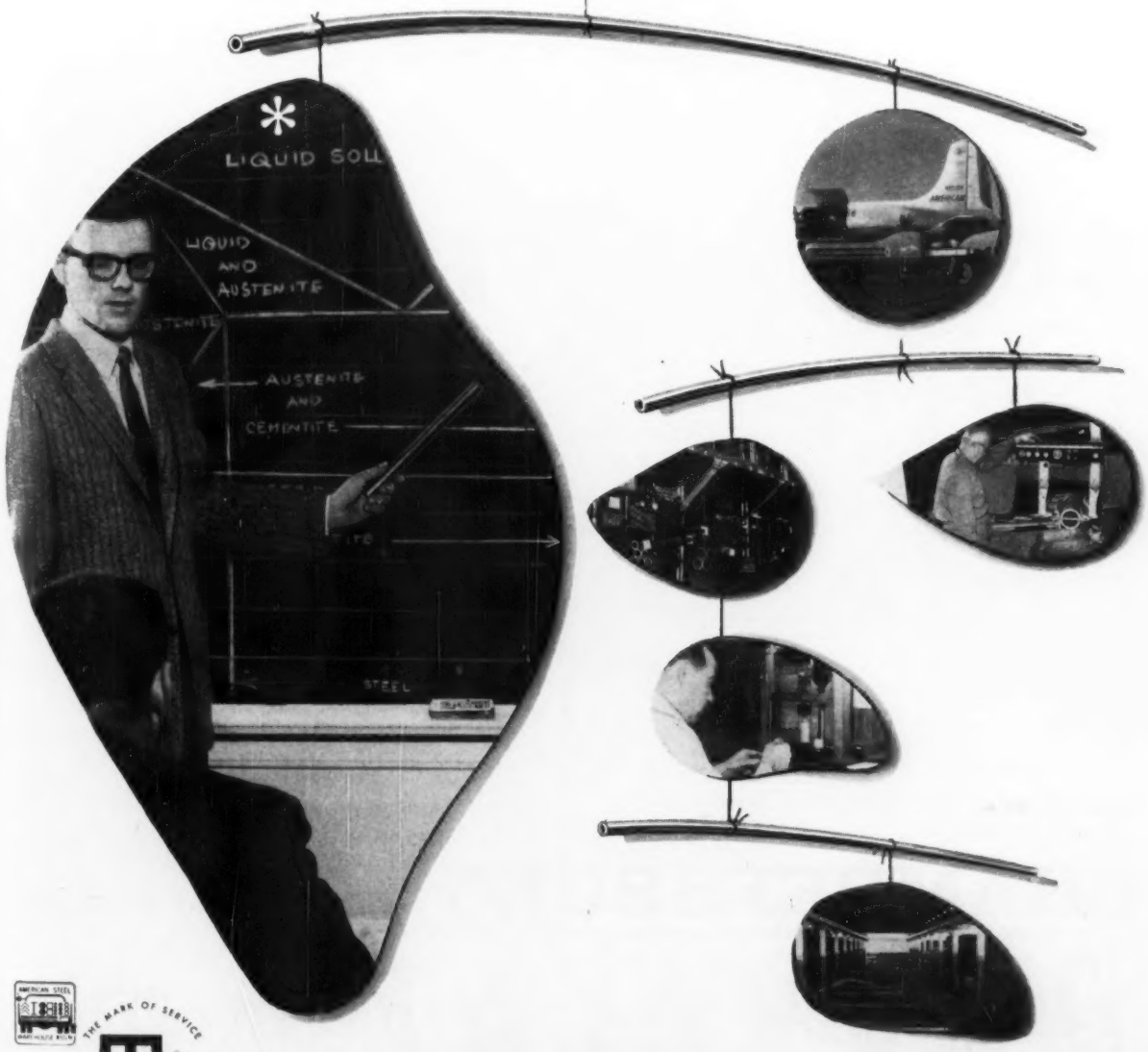
How?... By making full use of TD's "balanced service":

1. Technical assistance from steel tubing specialists*.
2. Thousands of sizes in all standard types and analyses in stock.
3. Systematic handling that insures on-time delivery.
4. Personalized Inventory Plan custom-tailored to your requirements.
5. TD's *complete* quality control program.
6. Extra warehouse service.

*TECHNICAL ASSISTANCE FROM STEEL TUBING SPECIALISTS! TD's technical and sales staff are all thoroughly trained men who take part in weekly training sessions which provide them with up-to-the minute knowledge of what's available, how it can be bought most economically, and how it can be fabricated. Put TD's technical assistance to work for you!

Call TD for—stainless, alloy and carbon steel tubing, both aircraft and commercial quality.

Write Dept. I-33 today for your copy of "Eighteen Ways to Save Money in Your Steel Tubing Purchasing," and the name of your nearest TD representative.



THE MARK OF SERVICE IN STEEL TUBING

TUBE DISTRIBUTORS CO., INC.

GARDEN CITY, NEW YORK • TWX: G-CY-NY-4695 • CABLE: TUBEDIS

The CECO-DROP makes other gravity drop hammers obsolete

THIS is no mere slogan; it is a statement of fact. Since its introduction twelve years ago, the Ceco-Drop, in installation after installation, has proved its greater productive capacity and its economy over any other gravity drop hammer.

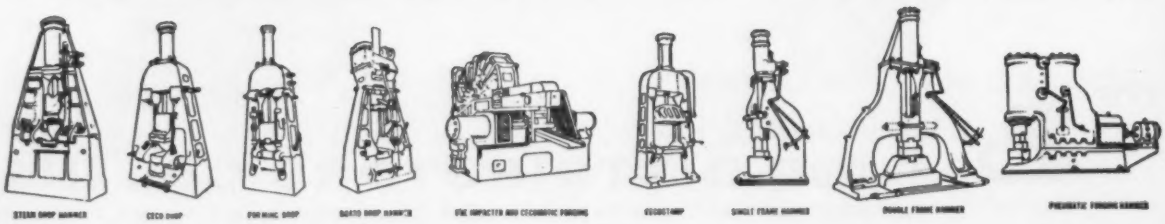
These are not unsupported claims. They are backed up by testimonials from users: like **"increased production over board drop between 10-20%"**; "die life on the Ceco-Drop is nearly double"; **"the first two Ceco-Drops have saved approx. $3000 each** in maintenance and boards in first year"; "after approx. 1200 production hours, one Ceco-Drop had total of less than 10 hours maintenance"; **"I would give a good deal if I had all of our board hammers out of the shop and nothing but Ceco-Drops"**; and hundreds of others.

To convince yourself, you should read Chambersburg's 28-page bulletin on Forge Shop Modernization.

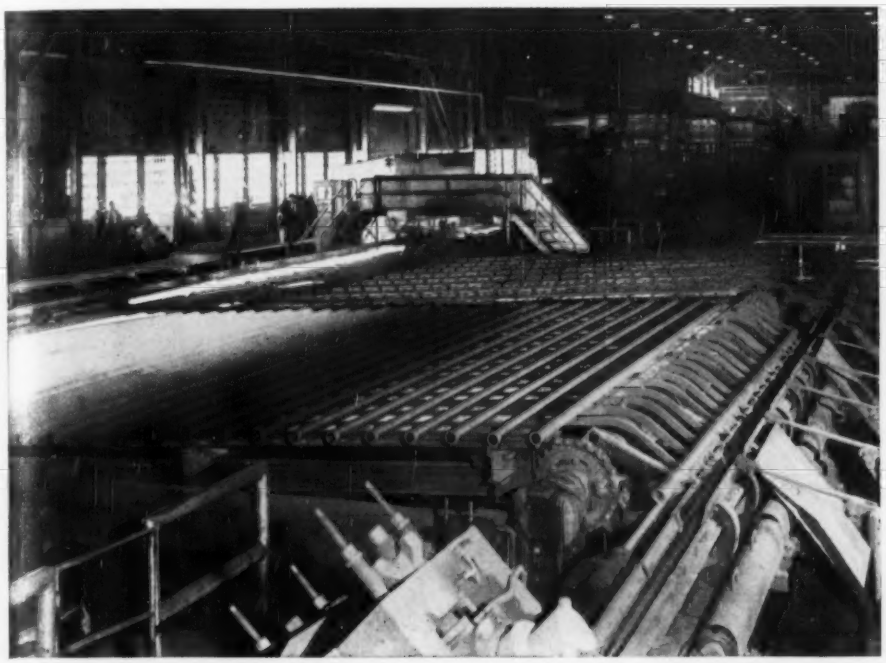
Send for your copy today.

CHAMBERSBURG ENGINEERING COMPANY . . . . . CHAMBERSBURG, PENNSYLVANIA

CHAMBERSBURG • The Hammer Builders



Many metal working operations need the extra qualities of Promal chain



LINK-BELT H CLASS PINTLE CHAIN with pusher attachments on this pipe cooling rack designed by Aetna-Standard Engineering Co. receives white-hot pipe from finishing operations in a continuous butt weld mill. Controlled chain speed permits uniform cooling of outer tube periphery.

Specially heat-treated malleable iron resists heavy and abrasive loads

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Promal will withstand repeated cyclic heating up to 1000° F. Its greater strength absorbs continuous impact loads, and high wear resistance supplies the durability to cope with severe abrasion.

A Link-Belt Development

Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform microstructure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance.

Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive or heat-conditions—for extra strength and wear resistance demanded by heavy loads or long sliding conveyors. They last much longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.

SMGL-618 PROMAL chain conveyor is another example of the applicability of heat-resistant Promal in the metal working industry. This chain conveyor with special joint design and riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure. The heat-resistant properties of Promal also make it a desirable material for use on low-temperature heat-treating equipment.

PHYSICAL PROPERTIES OF PROMAL

Compare this with other ferrous materials used for chain applications.

Yield Point	55,000 pounds per sq. in.
Ultimate Strength	75,000 pounds per sq. in.
Fatigue Strength	35,000 pounds per sq. in.
Elongation	10 to 14% in 2 inches
Average Brinell Hardness	170 to 190

PROMAL'S high strength factors make it ideal for the especially long elevators and conveyors employed in the metal working industries.

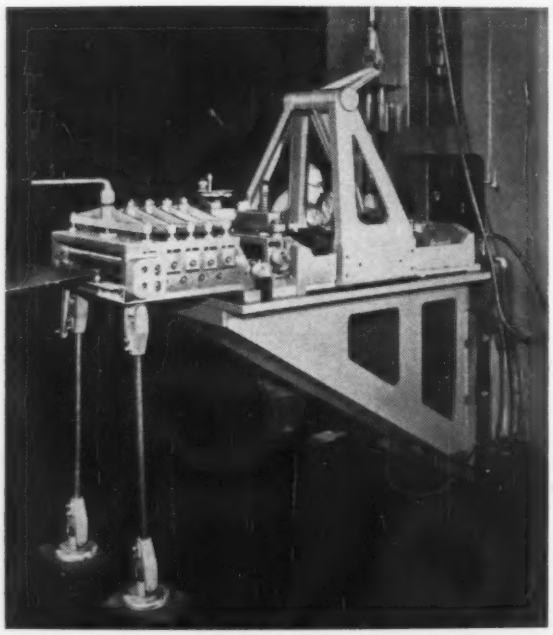
HEADQUARTERS for Link-Belt products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Refer to the yellow pages of your local phone directory.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13), Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,823

TEAMED FOR PRESS ROOM EFFICIENCY



U. S. Automatic Press Room Equipment is made to team perfectly with your present presses. All units are engineered and built solely to increase the efficiency of your presses — to bring you the savings which result from the use of coil stock.

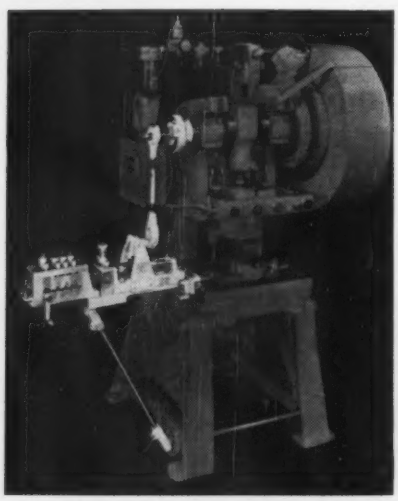
U. S. mechanical driven Slide Feeds have long been recognized by users as the most accurate automatic feeds on the market. They are built in a range of sizes with width capacities from 1½" up to 27", and all sizes can be teamed with matched Plain Stock Straighteners.

Where wire of round or irregular cross-section is to be fed, U. S. Slide Feeds are supplied with Two-way Wire Straighteners.

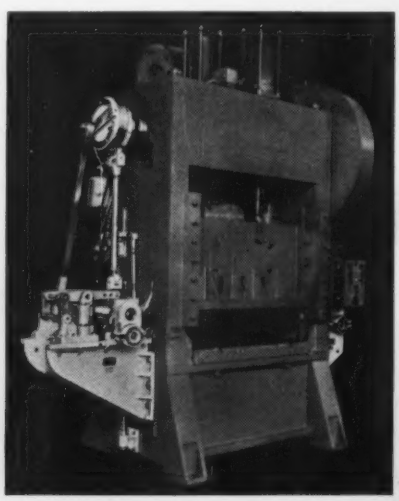
For certain applications, where roll feeding is desirable, U. S. Roll Feeds are available in either single or double types.

Whether you are working with .020" wire or wide flat stock, when you have U. S. equipment you have the perfect team for both short and long run jobs.

SF-2424 U. S. Slide Feed with an SS-24-8 Plain Straightener, mounted on a straight side press to feed from left to right. This combination is capable of handling stock up to 24" wide — maximum length of feed is 24".



Model SF-1 U. S. Slide Feed with matching Plain Straightener, for stock widths up to 2½" — maximum length of feed 4".



Model RF-1212 U. S. Double Roll Feed (Racks and Pinion Type). Capacity: for material up to 12" in width, feed length adjustable up to 12".

US PRODUCTS

Slide Feeds
Roll Feeds
Stock Straighteners
Stock Reels
Stock Oilers
Coil Cradles
Die Sets
Multi-Slides®
Multi-Millers®
Wire Straighteners
Combination Cradle Straighteners
Combination Reel Straighteners

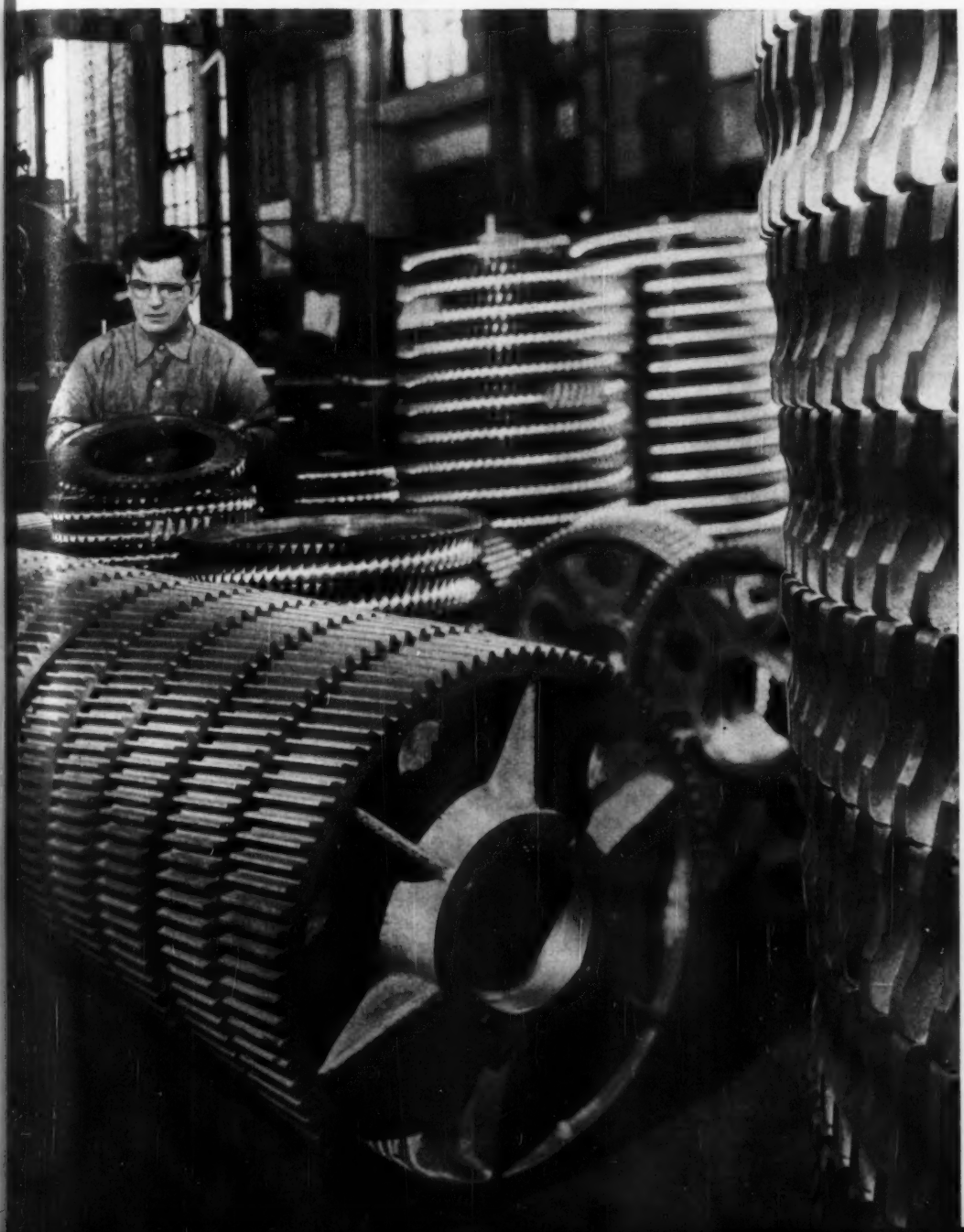
Complete information about U. S. Automatic Press Room Equipment is yours by asking for Bulletin No. 851.

U. S. TOOL COMPANY, INC.

AMPERE (East Orange) NEW JERSEY

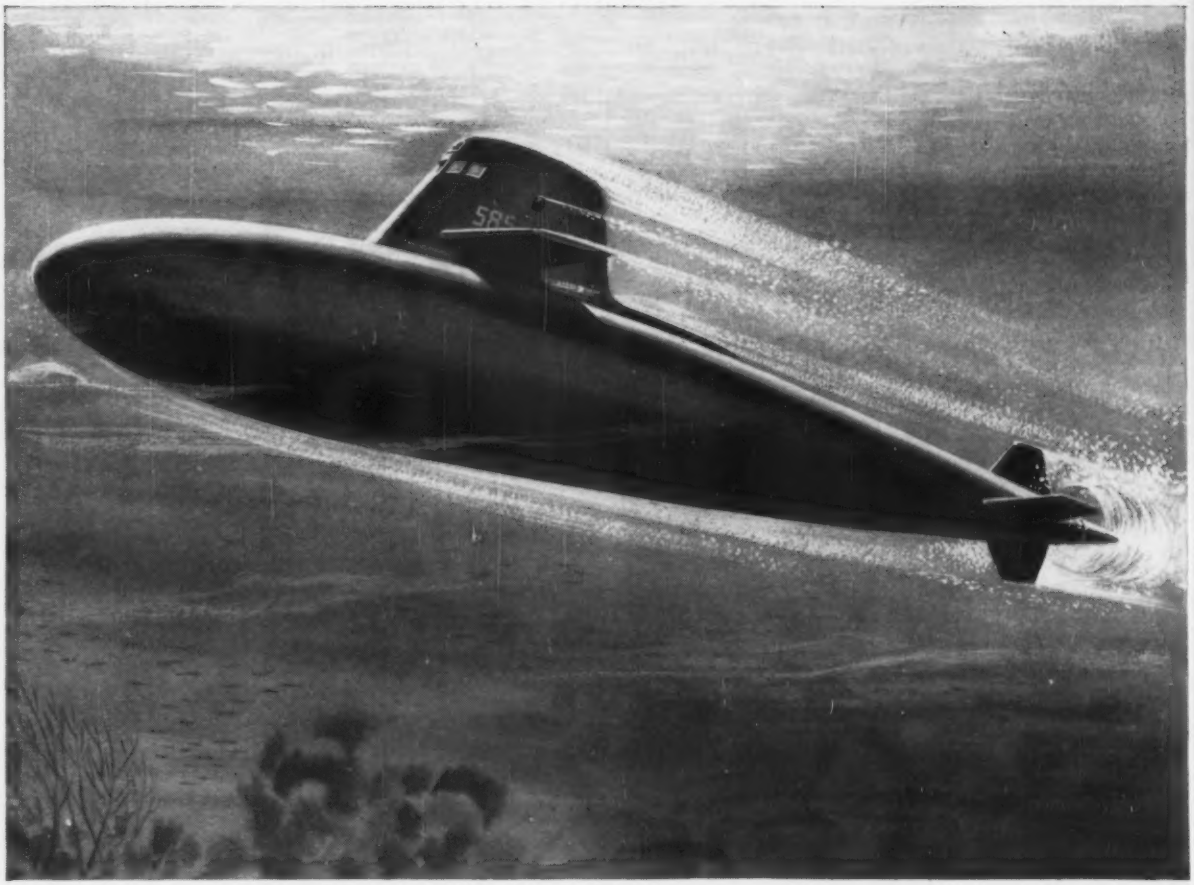
For truly engineered, truly trouble-free bronzes, specify Federated Silicon Bronzes (50% better ductility, tensile strength up to 65,000 psi); Aluminum Bronzes (heat treated, tensile strength as high as 120,000 psi, with correspondingly high yield strength); and Manganese Bronzes (as-cast tensile strength 125,000 psi, good ductility, high hardness). Federated Engineered Bronzes are the end results of highly perfected production techniques and continuous quality control procedures developed by experienced metallurgists in Asarco's Central Research Laboratory. Ask your Federated field man about Engineered Bronzes and Federated's complete line of quality-controlled copper base casting alloys. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY



Sandusky cylinders help the Skipjack CRUISE, DIVE, STEER, BREATHE and FIGHT!

Centrifugally cast cylinders by Sandusky play vital roles in the U. S. Navy's newest atomic-powered submarine, No. 585 *Skipjack*, as components of the nuclear propulsion system, the steering and diving systems, the torpedo firing mechanism, and radar and induction mast assemblies.

The *Skipjack* is the prototype of a new series of seven submarines all with blimp-shaped hulls for greater underwater speed. Her design and materials specifications were laid down by the U. S. Navy and her builder, The Electric Boat Division of General Dynamics Corporation, who chose Sandusky Centrifugal Castings to do more than ten jobs in structural, mechanical, pneumatic, and hydraulic applications.

All of these components – centrifugally cast of heat and corrosion-resistant stainless steels, high-strength carbon steels, Monels, and bronzes–provided the *Skipjack's* designers with the required mechanical and physical properties at the lowest cost.

You, too, may find a ready solution to your cylindrical problems in Sandusky Centrifugal Castings. We invite your inquiries.

Sandusky cylinders are cast and machined in this range:

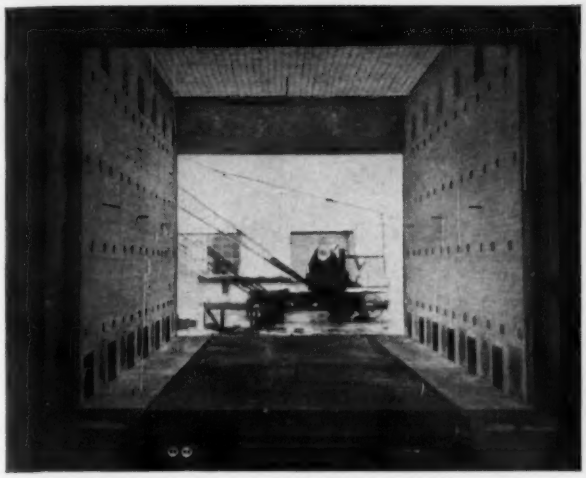
From 7″ to 54″ O.D.

Up to 33 ft. in length (depending on diameter)

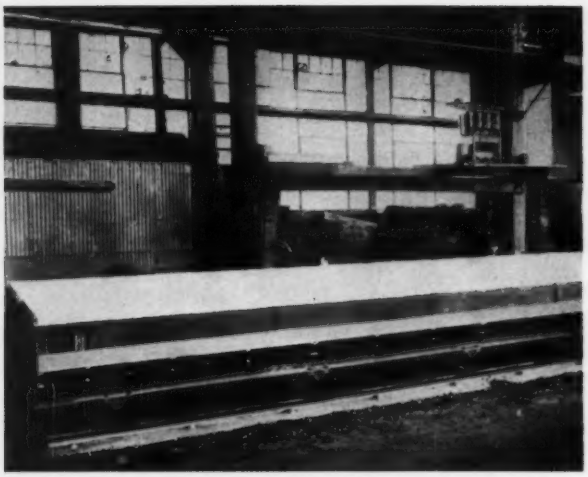
Light or heavy-walled

In a variety of alloys including Stainless, Carbon, Low Alloy Steels. A full range of Copper-Base, Nickel-Base Alloys.

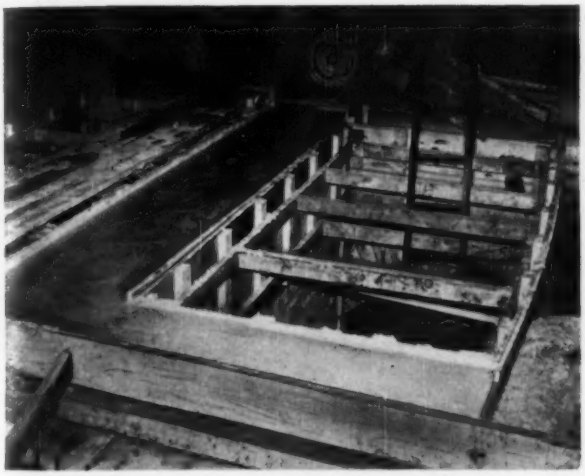
SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.
SANDUSKY, OHIO



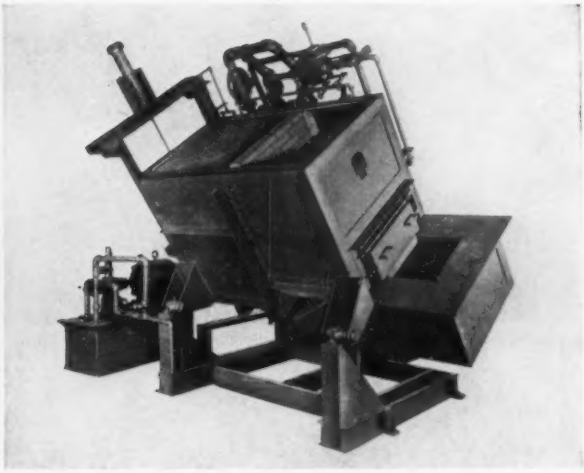
In this stress-relieving furnace, B&W Kaocrete-D is used on the floor ledges, car top, in the door jamb and at the end of the flat roof where it withstands the abrasion of the door. This material is specially designed to withstand severe abrasive conditions and mechanical abuse.



Heavy duty car top service requires a high strength castable. B&W Kaocrete-D is excellently suited for this service at temperatures to 2500 F. B&W Kaocrete-32 is recommended for service above this range.



B&W Kaocrete-32 has been cast to form the curb walls of a soaking pit. When mechanical abuse from ingots damages the curb, Kaocrete-32 has the necessary properties to localize the damage, thus maintaining the serviceability of the rest of the curb.



The castable lining of this aluminum reverberatory furnace must have unusually high strength to withstand the considerable physical abuse of charging, operating and cleaning, while resisting the penetration of the molten metal. Kaocrete-D is widely used in this application.

How B&W refractory castables solve abrasion problems

Refractory castable linings used in metal-working furnaces are often subjected to severe mechanical abuse. Scraping by hand tools, loading and unloading, and the action of the molten metal and particle-laden gases all affect the life of refractories. Among B&W's line of refractory castables are two that are particularly suited to withstand unusual abrasive conditions. They are B&W Kaocrete-D and B&W Kaocrete-32, both of which have been used successfully in many demanding applications.

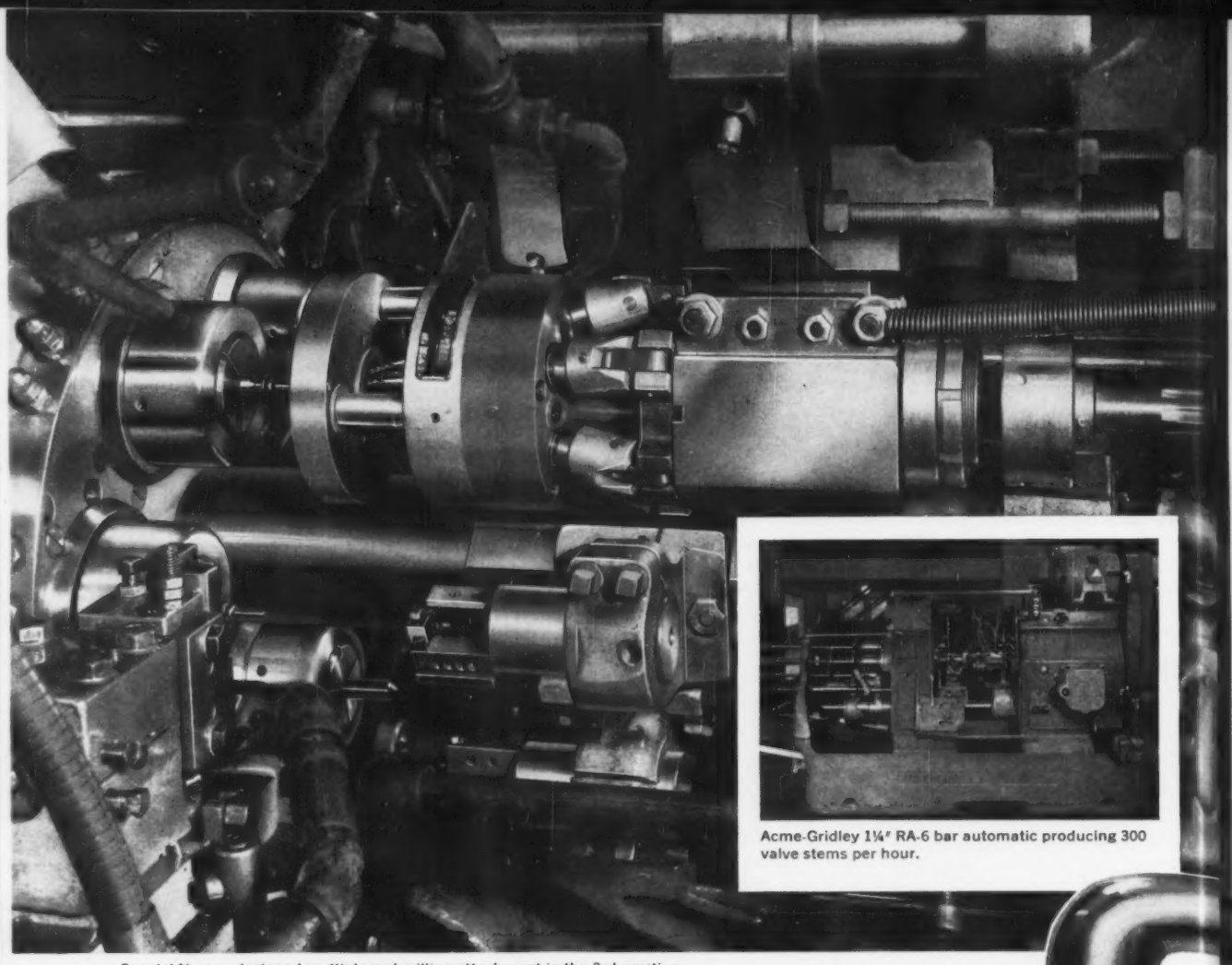
Send for a copy of B&W Bulletin R-35A. It gives additional information on versatile B&W refractory castables.

REOS

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.



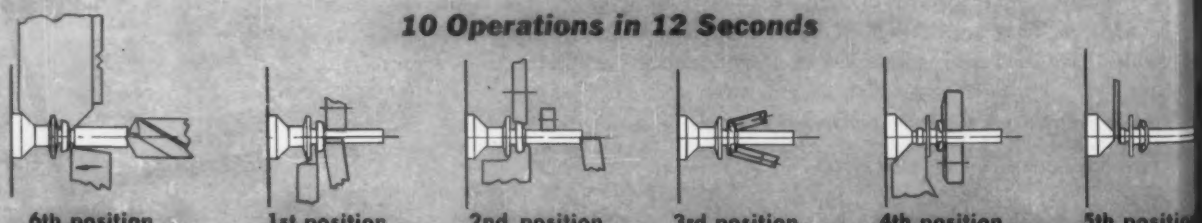
Special Namco-designed multiple end milling attachment in the 3rd position.

Acme-Gridley 1¼" RA-6 bar automatic producing 300 valve stems per hour.

When Tolerances and Finish Looked Economically Impossible

AMERICAN-STANDARD TURNS TO ACME-GRIDLEY...

10 Operations in 12 Seconds



6th position Rough form rear —rough turn stem —spot drill

1st position Finish turn stem face large diameter

2nd position Shave—face and chamfer stem end

3rd position Stop spindle— mill six slots

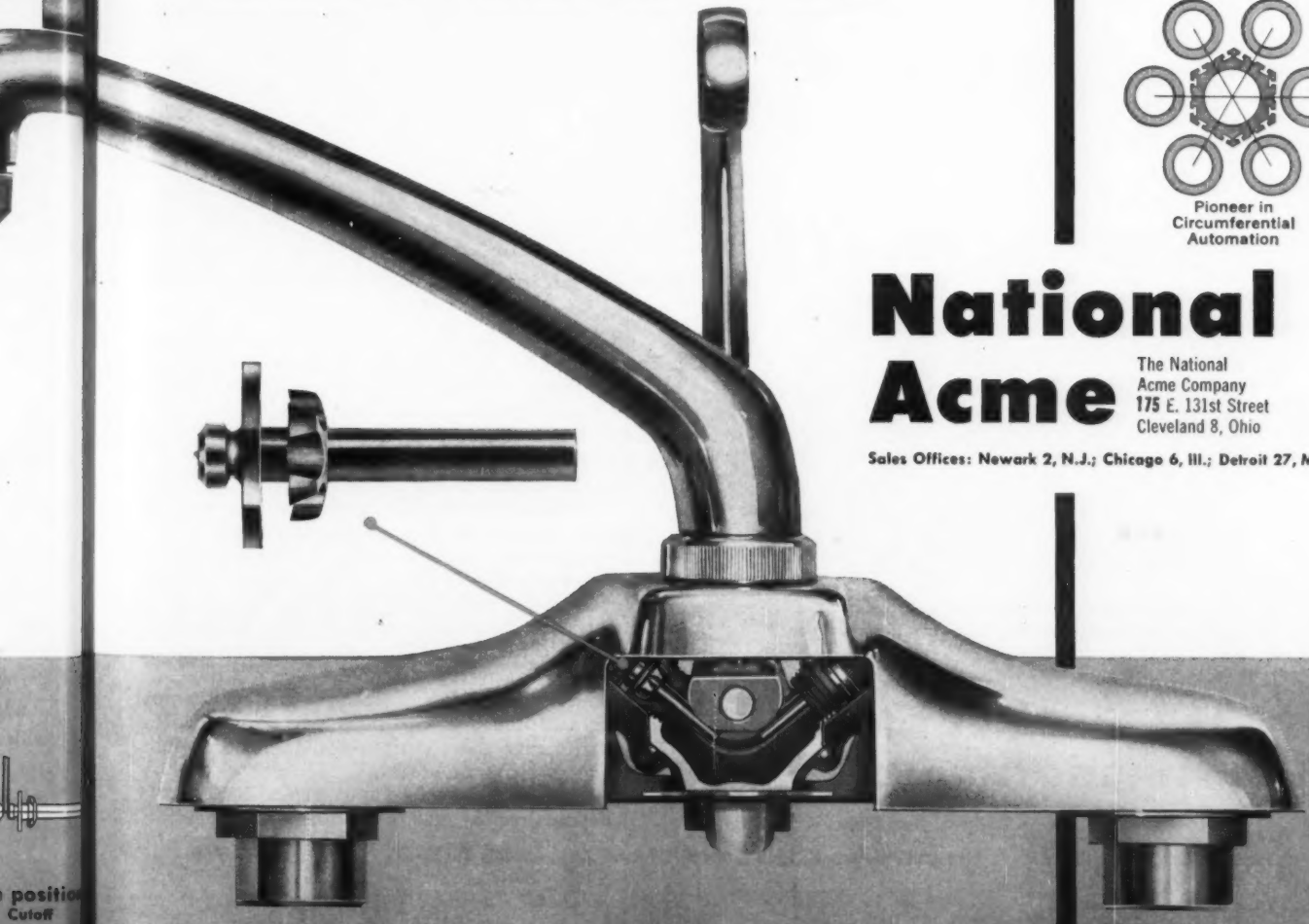
4th position Start spindle— burnish stem— form back end

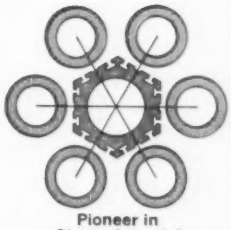
5th positio Cutoff

COMPLETED IN A SINGLE SETUP . . . this hyseal valve stem is a vital component in American-Standard's single-lever mixing faucet. Production by other processes would have meant a two-piece assembly. It would have been economically impossible to meet the high standard of quality and exacting tolerances maintained on this company's products.

Ten operations, including multiple end milling of six half-holes on a 15° angle, were performed on this 303 stainless steel piece in 12 seconds. Rigid specifications required a 20 microinch finish and limits of .002 t.i.r. between seating surface and end of valve stem.

Advanced spindle stopping design and the inherently accurate indexing of Acme-Gridleys, assure proper alignment of the work with the standard and special tool attachments. This, together with wide open tooling zones and independently operated tool slides, helps assure the solution of "impossible" jobs at National Acme. Write or ask one of our representatives for the complete story on the industry's most modern approach to your cost reduction problems.





Pioneer in
Circumferential
Automation

National Acme

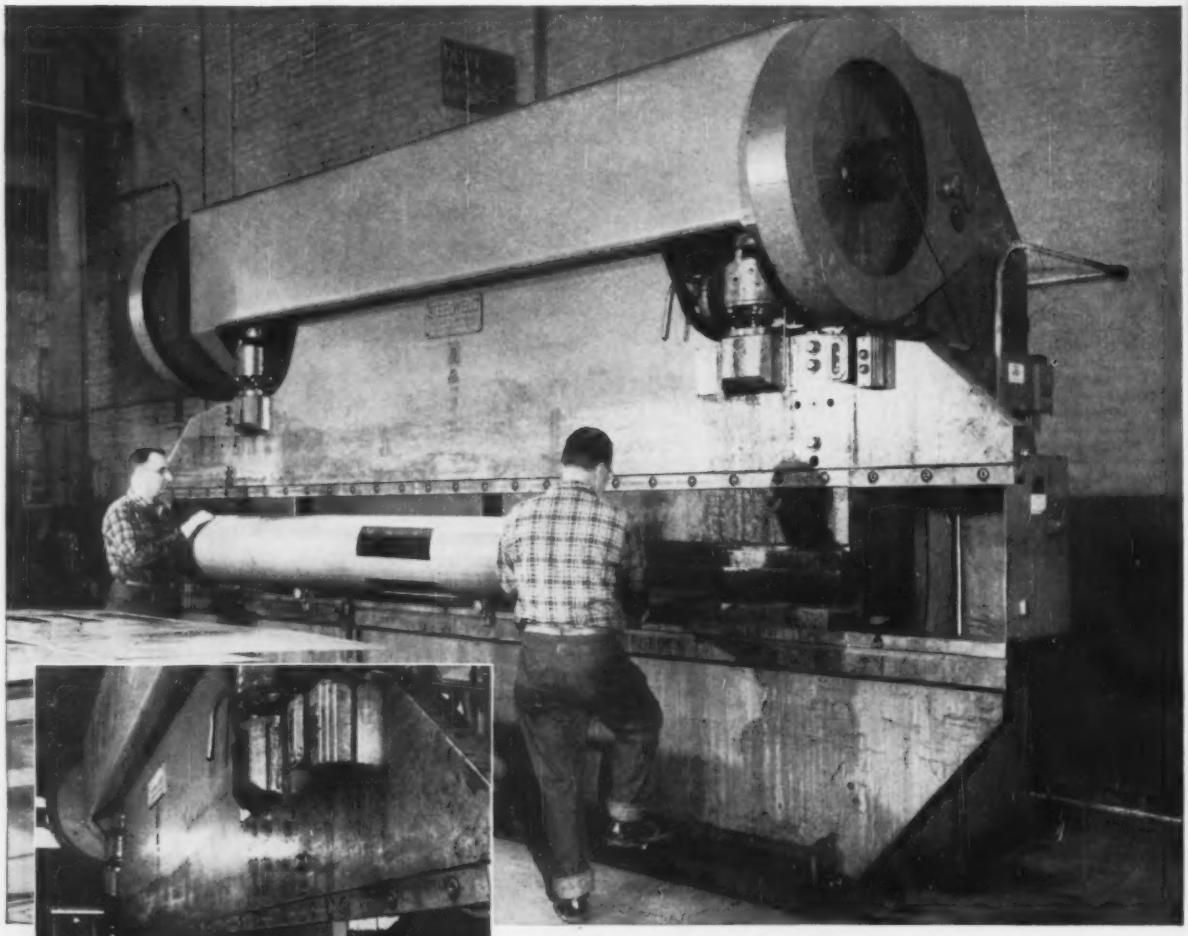
The National
Acme Company
175 E. 131st Street
Cleveland 8, Ohio

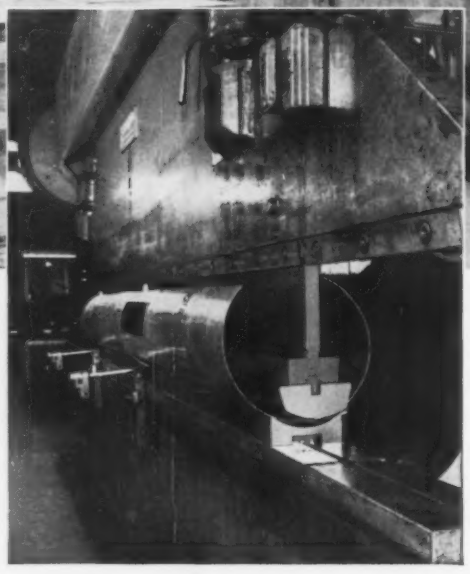
Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

COMBINE AUGER TUBES

25 to 50 Made Per Hour at Massey-Harris-Ferguson, Ltd.

Steelweld Brake in service since 1950. Bed and ram are 18'-0" long including 2'-0" extensions at both ends. Bending capacity rated at 12' x 3/16".





Flat metal is quickly formed into a cylinder by a series of pressure contacts with this die arrangement.

AUGER tubes for combines made at Massey-Harris-Ferguson, Ltd., Toronto, are produced at rates of 25 to 50 per hour, depending upon conditions, with a Steelweld Brake. The tubes are from 10 to 16 feet long and made of 16 gauge steel.

This job represents one of a multitude performed at low cost on this brake, which is used for many bending and metal-forming operations required for the various farm implements built by Massey-Harris-Ferguson.

Steelwelds are popular with farm machinery manufacturers and have been serving many for years. They perform accurately, keep going continuously on long production runs without need of frequent adjustments, tinkering and maintenance. They are easy and safe to operate. Dies are quickly changed.

Because Steelweld Brakes are heavily built machines loaded with features that will help you, it will be to your interest to give them serious consideration when additional brakes are needed.

STEELWELD
PRESS BRAKES

Write for free copy of Catalog No. 2010
Gives construction and engineering details

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO., 4868 E. 281ST ST. • WICKLIFFE, OHIO

Eleven Wean lines produce cut-to-length tin plate for Weirton Steel

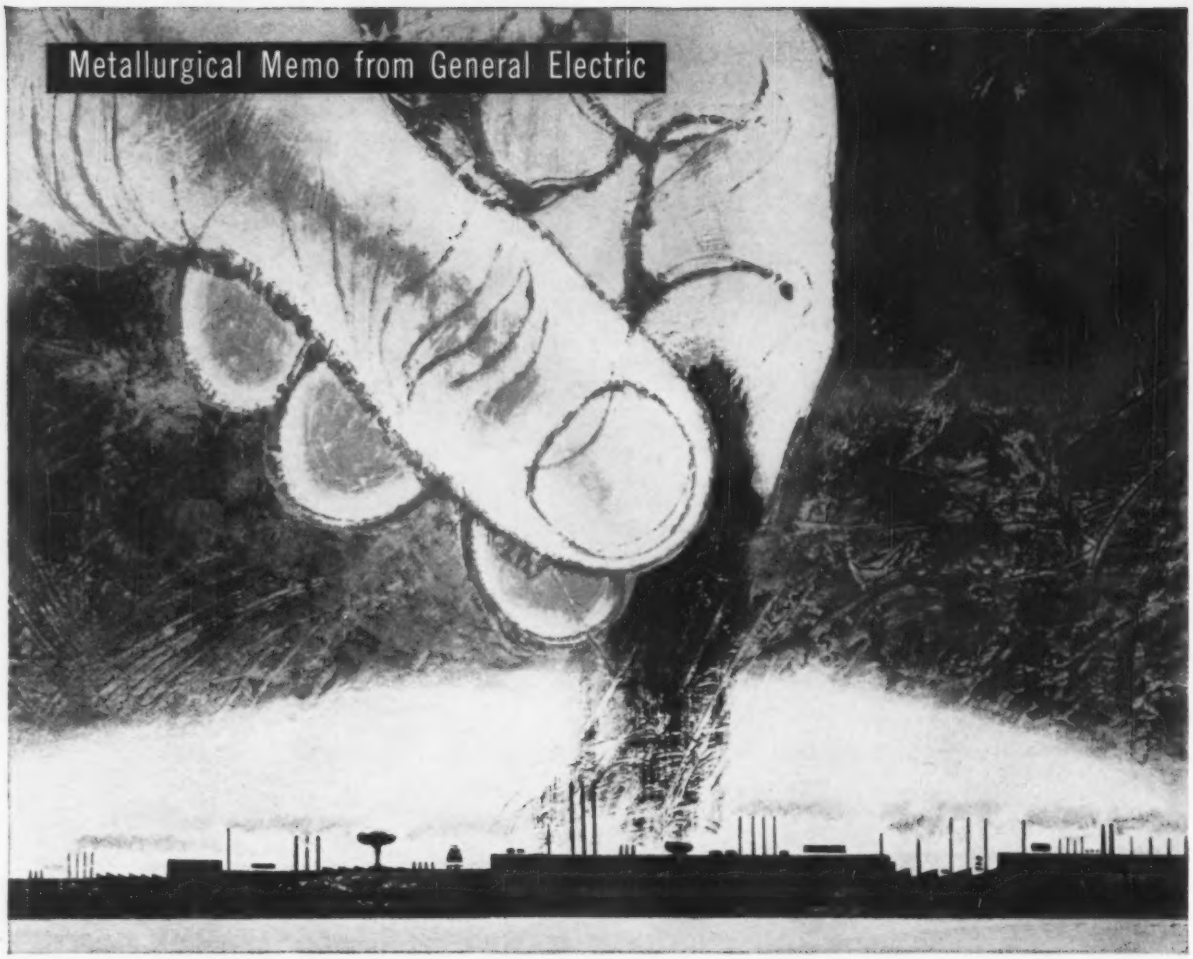
The eleven Wean shearing lines illustrated process all the cut-to-length tin plate output at the Weirton plant of Weirton Steel Company, Division of National Steel Corporation. The lines incorporate the functions of side trimming, edge conditioning and inspection, as well as shearing to close tolerances at high speeds.

Wean has had extensive experience in the continuous processing of tin plate from cleaning, through annealing and electrolytic tinning to inspection and cut-up. Most of the industry's tin plate facilities have been designed and built by Wean.

Wean's leadership in this field is the result of its close working relationship with the steel industry. Throughout this partnership, Wean's *creative engineering* has helped translate laboratory developments in continuous steel processing techniques into full-scale production installations.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN • OHIO



260 ways to "package" a pinch of powder

Metallurgical Products Department reports on a line of 260 locally-stocked Carboloy® cemented carbide inserts that slashes inventory and special-order costs

Carboloy cemented carbides start as metal powders – end as man-made metals in a variety of disposable inserts *unmatched* in the industry.

And that's where you save with Carboloy cemented carbides. You choose from 260 different inserts – 11 styles – 7 cutting grades – in any size, thickness, radius, or shape you need. You get an insert that's almost tailor-made for your particular job without costly special-ordering; and you get it *fast*, from a *local* distributor who carries your inventory *for you*.

All Carboloy cutting tools are stocked by your local Authorized Carboloy Distributor. Call him (see the Yellow Pages, under "Carbides"); or write: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Road, Detroit 32, Michigan.*

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

. . . performance beyond the usual . . .

Design of high-speed precision machinery often calls for bearings which offer the utmost in load capacity, "hot hardness", dimensional stability. Each machine presents its own exacting requirements.

Fulfillment of unusual requirement combinations is a specialty at Rollway. Your selection of exactly the right precision radial cylindrical roller bearing is assured by:

- **A broad range of types and sizes, numbered in the thousands**
- **Retainers of standard bronze or "Rollube" ferrous alloy, in roller-riding, land-riding, or broached construction**
- **Crowned rollers**
- **Modification of any factor to meet your application**

ROLLWAY

MAXIMUM

BEARINGS

To further implement your choice, the Rollway Catalog and Engineering Data Book contains the first listing, by any manufacturer, of the thrust capacities of cylindrical radial roller bearings.

ROLLWAY BEARING CO., Inc., Syracuse 1, N. Y.

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Maximum
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Syracuse • Boston • Chicago
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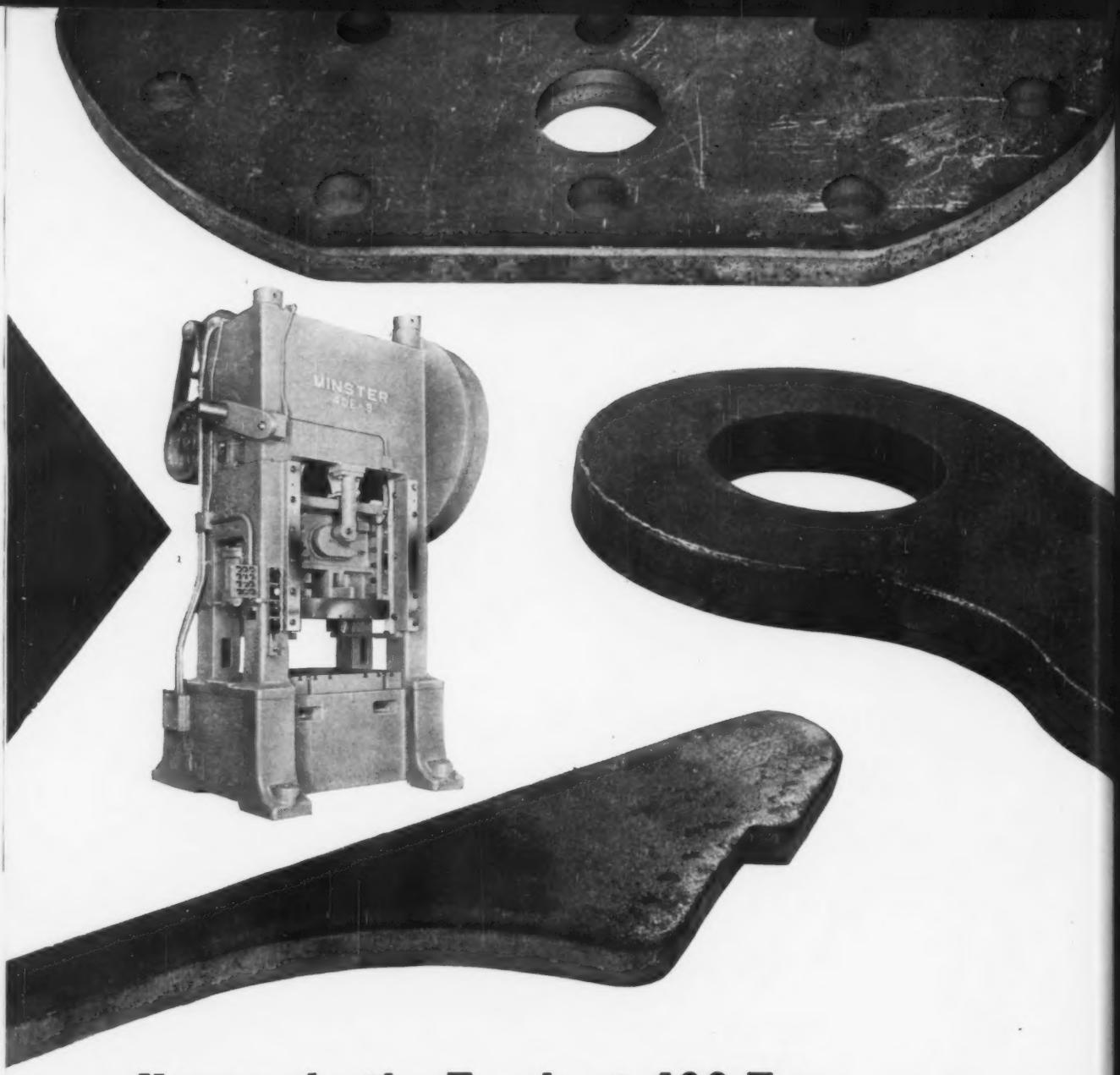


How to do the Toughest 400 Ton Heavy Material Blanking Jobs *economically*

Use a press properly designed to exert the tremendous forces required.

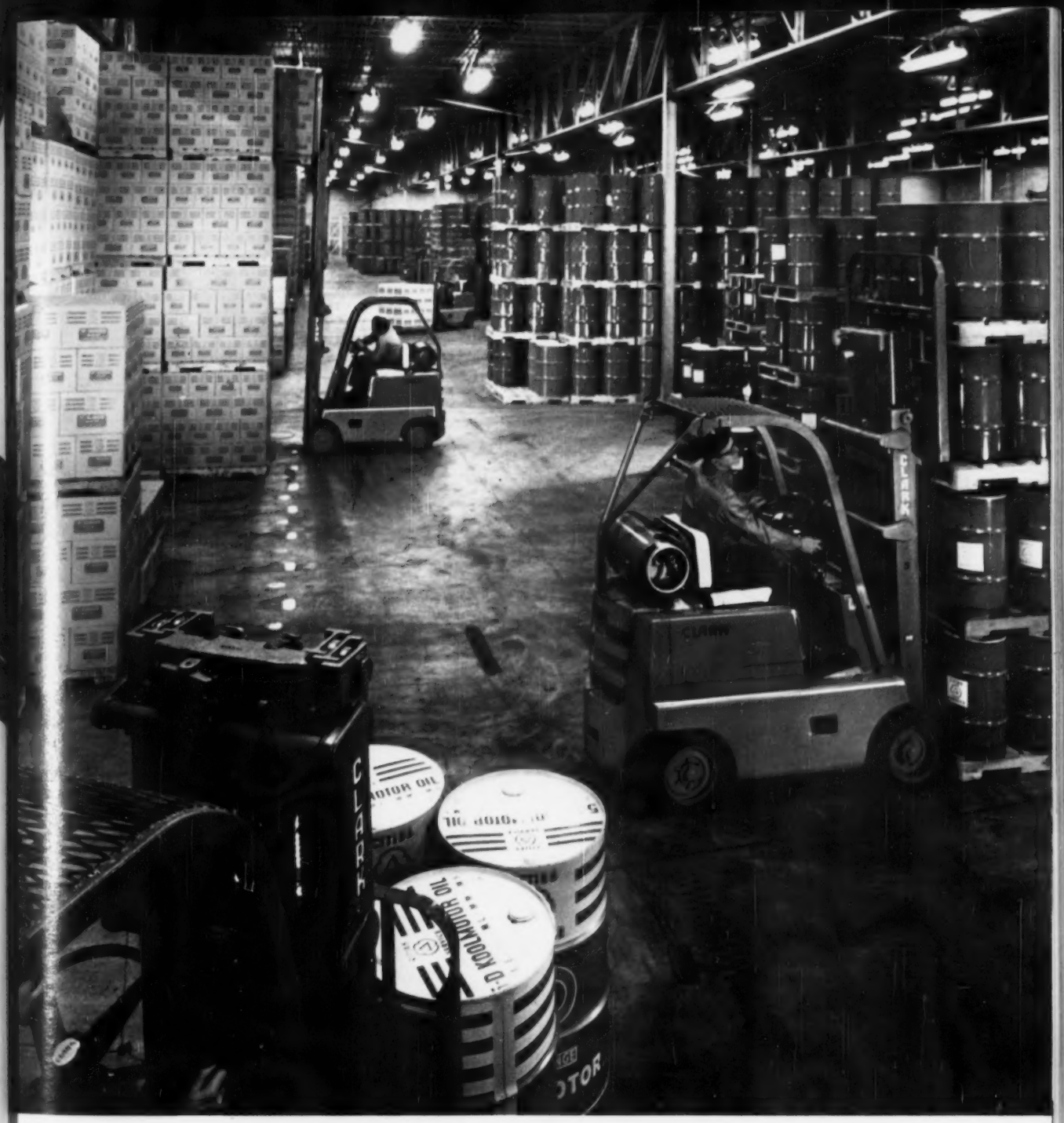
Use a press with the rigidity and mass to withstand the terrific shock of impact and sudden release of "snap-through" force encountered when blanking, punching or shearing heavy material.

Use a press that will give you high production with longer die life.

Use *the* heavy duty blanker . . . MINSTER 40E-9

The construction features that put the Minster 40E-9 press in a class by itself for this type of work are described and illustrated in a new Bulletin No. 12. May we send you a copy?

THE MINSTER MACHINE COMPANY • MINSTER, OHIO



You're paying for new trucks...why not own them?

Times change. So does equipment efficiency. The new *Clarklift* fork trucks pictured above, for example, have been tested and proved to be 30% more efficient than the average truck in use today. Over four years of designing, testing, and field-proving has demonstrated time and again that *Clarklift* owners get a fast return on their investment in extra production alone.

And, of course, if you have old equipment, there's the high cost of maintenance to consider. If your present trucks are frequently down for repairs, you're paying dollars not only for the parts and labor involved, but you're also paying for lost production, supply and shipping bottlenecks, poor use of manpower. It all adds up. It means you're paying for new equipment every day . . . *but without owning it.*

A planned equipment replacement program is worth investigating. Simply write: Planned Replacement, Clark Equipment Company, Battle Creek, Michigan. We'll arrange to have a representative call to survey your operation and explain the various programs available.

CLARK® EQUIPMENT

CLARKLIFT is a trademark of Clark Equipment Company

U.S.A.

Tubexperience in action

How does carbon content control hydraulic tubing quality?

Precise metallurgical controls help Superior's (SAE) Hydraulic Tubing outperform all other types

*Extra quality is the reason for the high ductility and longer, more reliable service you get with Superior hydraulic tubing. This extra quality is actually built in through precise metallurgical control.

Carbon content is held to .12% maximum through controlled atmosphere annealing. This assures highest ductility commensurate with the strength needed in the tubing.

Superior (SAE) Hydraulic Tubing is made from selected billets of non-aging steel. These are segregated by heat numbers, and a customer's order is always filled from one heat. This assures complete uniformity of all the tubing shipped to him in that order.

Each order also undergoes many critical examinations. Among these are checks on elongation, yield and ultimate strength. Every length is also 100% hydrostatically tested to maximum working pressure. And close control is exercised over grain size and microstructure. This is done microscopically with the aid of metallographic mounts. And finally, if requested, we furnish a notarized report on the chemical and physical properties of the tubing produced.

Superior (SAE) Hydraulic Tubing is furnished in dead-soft annealed temper for easy bending and flaring. Order in cut, multiple or random straight lengths up to 30 ft.—or longer in coiled form.

For more data on our (SAE) hydraulic tubing, get a free copy of Bulletin 39. Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

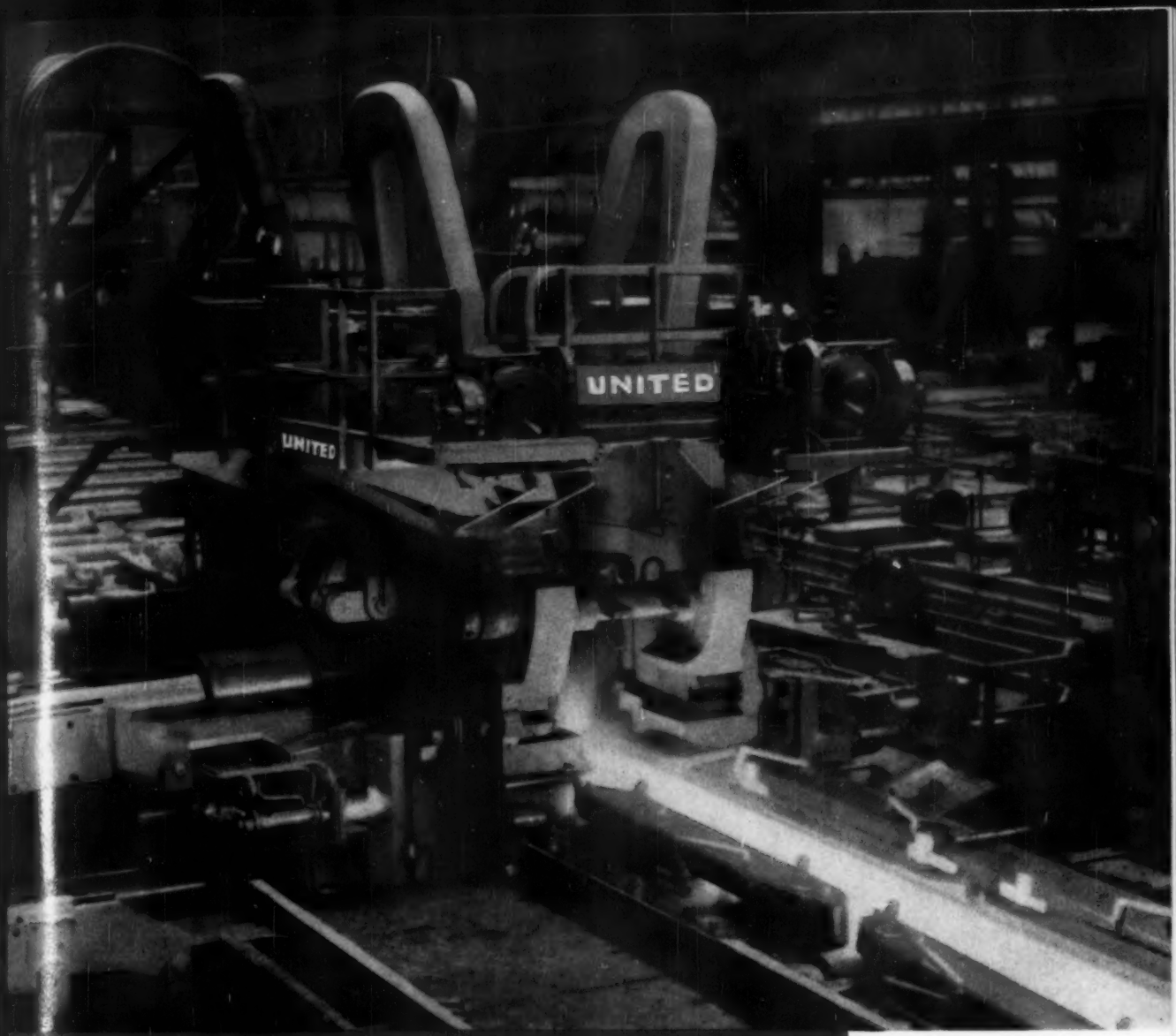
Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company • 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331



UNITED

WIDE FLANGE BEAM MILL

UNITED ENGINEERING AND FOUNDRY COMPANY

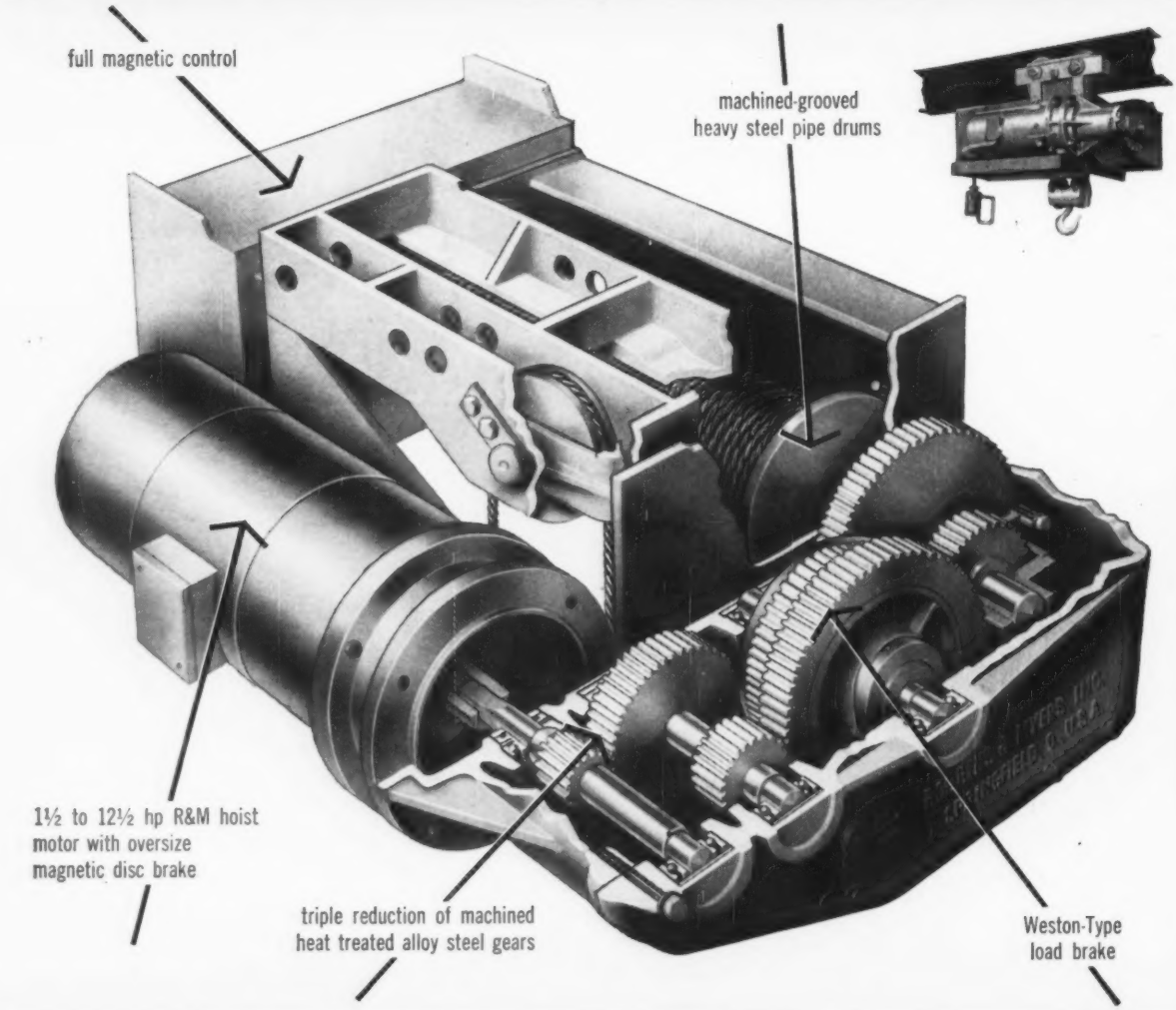
PITTSBURGH, PA.

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stockton Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Rolling and Processing Mills, Mill Equipment, Auxiliary and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nonferrous and Steel Castings and Weldments

big hoist value


full magnetic control
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triple reduction of machined heat treated alloy steel gears
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R&M Type F standard low-headroom hoists excel in the heaviest, most severe service. Frame is solidly braced welded steel. Special weather and dustproof R&M hoist motor runs cool, has the highest time rating found in any standard hoist—30 min., 55° C. rise. And the oversize magnetic disc type motor brake requires virtually no adjustment. Full magnetic control with reduced push-button voltage is standard. With lug mounting, Type F-2 headroom is only 16½" in 2 ton capacity.

Capacities: ½ to 10 tons. Speeds: 10 to 54 fpm. Lug mounting; push, hand geared or motorized trolleys.

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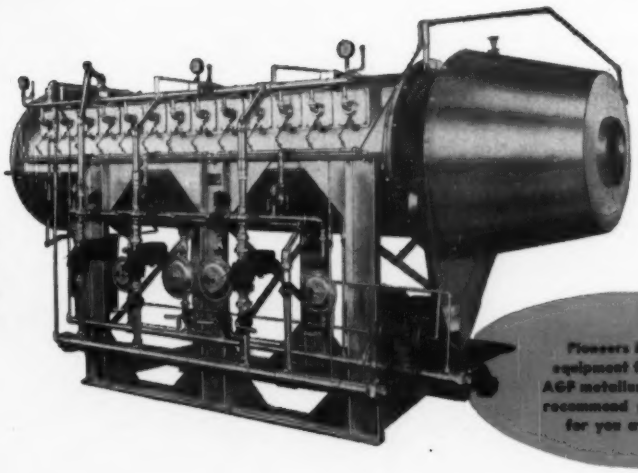
Use this continuous production furnace without modification for general and atmosphere work, including "Ni-Carb" ammonia-gas carburizing. Gentle tumbling action mixes the work and assures uniform heat treating.



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Extra Care at "The Department Store of Steel" helps you meet your production schedules

● When you receive steel that's properly packaged, protected from damage and cut to the right specifications, you know you've saved time—and money.

That's why all J & L warehouse personnel practice *extra care* from the time your order comes in . . . to the time you receive your shipment. This extra care can often make a big difference in your production costs.

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THE

DO WE NEED A NATIONAL SALES TAX? Joel Barlow, Washington tax attorney, believes such a tax is "inevitable." He argues that we've milked the income tax for all it's worth. Now, he says, we'll have to turn to a sales tax to help pay for the cold war.

ALUMINUM PRODUCERS are going all out to take rigid electrical conduit business from steel. Recent price cuts are said to make aluminum conduit cheaper than steel on an installed basis. For some applications, that is.

REPORT FROM U. S. CENSUS BUREAU: The very young and the very old are rapidly growing in numbers. Working adults (18 to 64) are increasing by about 5.5 million a year—the slowest growth rate of all age groups.

YOUR SALES IN A STATE are now subject to state taxes even though you do not maintain a sales office in the state. In a case involving Brown-Forman Distillers Corp., the U. S. Supreme Court ruled: Tax liability can stem from mere order taking.

PLASTIC-COATED STEEL SHEETS are aiming for a bigger market. Now that U. S. Steel is in the field, you can look for a big promotional push.

OVERLAND TRUCK TONNAGES ran ahead of last year in the week ended Feb. 28. Reports from 34 metropolitan areas show a gain of nine per cent, according to the American Trucking Assn.

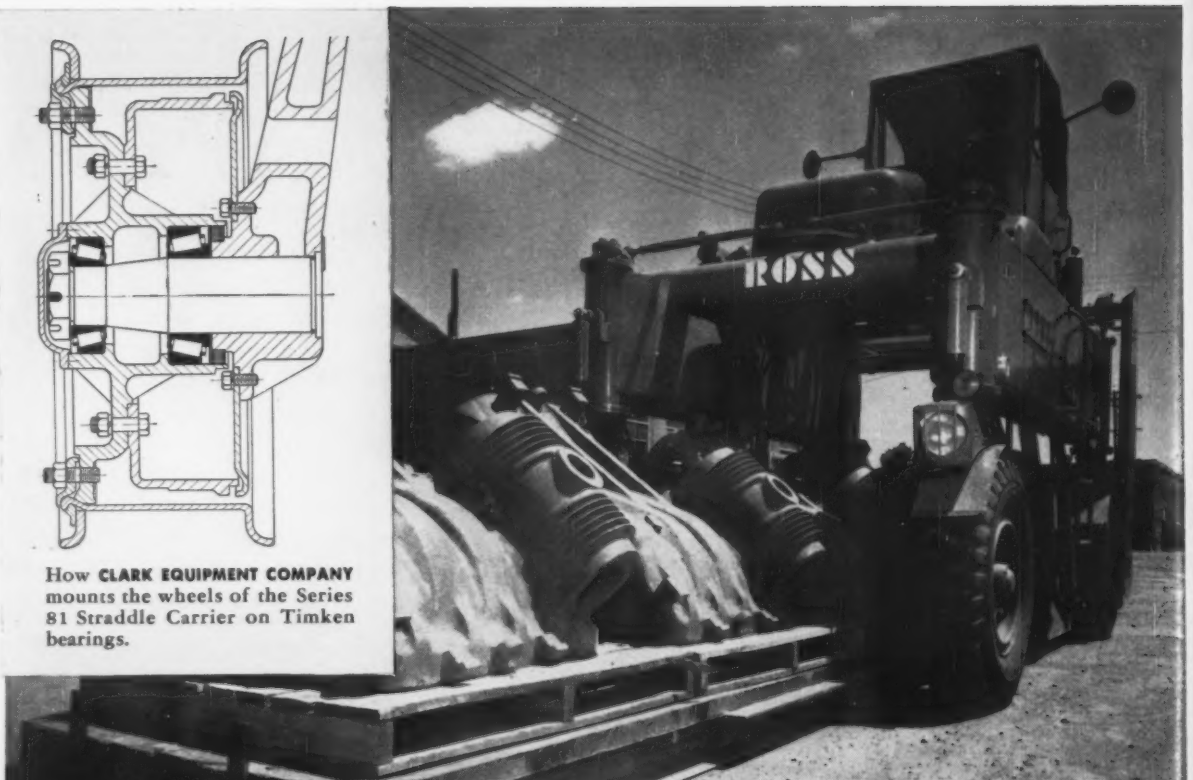
OHIO IS IN FINANCIAL TROUBLE, according to Gov. Michael V. DiSalle. He says the state will need an additional $300 million in the next two years. One proposal to get more money is to double the state's corporation franchise tax.

OXYGEN OUTPUT IN 1959 will exceed 80 billion cubic feet, according to William M. Haile, president of Linde Company. Mr. Haile says this is a 20 billion cubic foot increase over 1958.

FROZEN FOOD PACKAGING is still the biggest potential market for aluminum foil containers. Aluminum Foil Container Manufacturers Assn. says frozen food and baking account for about 95 pct of aluminum container output. A record of close to 37 million pounds of aluminum foil were used in production of rigid foil containers in 1958.

CLOSE-UP ON BUSINESS RECOVERY: Purchasing Agents' Assn. says its February survey indicates the business recovery is moving along fine. Steel is leading recovery, capital goods are lagging.

How **CLARK EQUIPMENT COMPANY** mounts the wheels of the Series 81 Straddle Carrier on Timken bearings.



Pay load: 10 tons—Top speed: 42 m.p.h. Wheel bearings: Timken®

WHEN this Clark-Ross Series 81 Straddle Carrier hoists 10 tons and scoots it 42 mph, terrific loads are placed on the wheels. To take *all* the loads, Clark engineers specified eight Timken® tapered roller bearings.

Timken bearings are tapered to take radial and thrust loads in any combination. No additional thrust devices are needed—not even when the Carrier makes a turn. Timken bearings take the shock loads, too, as no other bearing can. Rollers and races are *case-carburized* to give hard, wear-resistant surfaces and tough, shock-resistant cores. And the full-line contact between Timken bearing rollers and races gives *extra* load-carrying capacity.

There's less maintenance with Timken bearings. Closures are more effective because shafts are held concentric with housings. Dirt stays out; lubricant in. And you get longer bearing life because Timken bearings are geometrically designed to roll true and precision-made to live up to their design. Timken bearings practically eliminate friction.

When you build or buy machines of any type, do as Clark Equipment Company did for this Straddle Carrier. Insist that the trade-mark "TIMKEN" be on the bearings. It's your symbol of BETTER-ness! The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

BETTER-ness rolls on **TIMKEN**® tapered roller bearings

How Westinghouse Saves Money On Its Steel Buying

Careful planning avoids premium prices during periods of steel shortages.

It pays to lead the pack when the going gets tough in steel. —By G. J. McManus.

▪ The current scramble for steel finds one purchasing department surprisingly serene.

At the East Pittsburgh works of Westinghouse Electric Corp., top purchasing men D. A. Riggs, Manager, Purchases and Traffic, and W. C. Meyer, Purchasing Agent, are not relaxing. They are making regular checks on the status of orders with steel mills.

Buildup Started Early—But they move into the shortage period with a greater feeling of security than at any comparable time in the past. The East Pittsburgh works began ordering extra sheet tonnage in December. It began a buildup of bars and structurals in January.

The program of building plate inventory as protection against a shortage actually began in 1957.

No Last-Minute Rush — The plant's early start on inventory leaves only the problem of policing deliveries. Tonnage needed was booked some time ago. There is no last-minute rush to get on the bandwagon.

New Ideas Help — Two factors have contributed to this comfortable situation. First, the purchasing department reacted alertly to the change in steel supply. Secondly, a new concept of inventory management has been applied at East Pittsburgh.

The alert reaction is the product of many elements. For one thing there is general recognition throughout Westinghouse of the high cost of steel shortages. Over the past 10 years, East Pittsburgh has paid more than $4 million over mill prices for premium steel. The company's Sharon plant has spent more than

How to Cut Costs in a Tight Steel Market

The Sharon, Pa., plant of Westinghouse Electric Corp., figures it's cheaper to carry excess inventory than it is to be caught short and have to pay premium prices for steel to keep production lines moving.

Here's how the Sharon plant, which is a heavy buyer of plate, estimates it could have saved $1.9 million between 1945 and 1957 by maintaining its inventories and minimizing purchase of premium-price steel:

	Proposed Method			What Actually Happened	
	Excess Inventory Cost	Cost of Premium Buying	Total Cost	Premium Tons Bought	Premium Cost
1945	—$23,000				
1946	— 51,300				
1947	— 47,952				
1948	— 13,232			8933	$625,310
1949	+ 10,260			5183	362,810
1950	+ 16,212	$45,640		2745	192,150
1951	+ 23,244	241,290		3195	223,650
1952	+ 32,472	199,220		4581	320,670
1953	+ 31,800			1639	114,730
1954	+ 16,440			65	4,550
1955	— 16,896			1532	107,240
1956	— 27,972			5388	377,160
1957	— 7,932			1736	121,520
Net	—$59,076	$486,150	$545,226	34,997	$2,449,790
			Proposed plan premium and carrying cost		545,226
			Saving		$1,904,564

Minus(—) indicates greater cost for proposed plan.

New Approach to Shortages

Need for Change—Over the past 10 years, shortages of steel plates have meant heavy extra costs for the Sharon and East Pittsburgh plants of Westinghouse Electric Corp.

Both have operated on the conventional method of gearing plate orders and inventory turnover to current use. To get away from recurring shortages, these new plans have been devised:

East Pittsburgh — Plate inventories have been stabilized by basing turnover on average long-term consumption rather than current consumption. Plate stocks are held at a level equal to six months average use.

Under this plan, inventories remain constant. Steel orders fluctuate to the extent that consumption varies. The plan would have saved more than $4 million over the past 10 years.

Sharon—The plan proposed by Sharon would stabilize steel plate orders on the basis of trend lines projected from the past.

Regardless of consumption or inventory level, the plant would order a pre-determined amount of plate. Inventories would fluctuate with consumption; steel buying would remain relatively constant. The plan would have saved $2 million over the past 10 years.

$2 million on the same basis.

Long-Range Approach—To help avoid future pinches, Westinghouse has developed a long-range approach to steel buying. Under the leadership of Andrew Kennedy, vice president, purchases and traffic, steel buyers work full time to maintain good relations with mills.

The purchasing plans of individual divisions are coordinated centrally by a committee of buyers from the plants. Orderly buying patterns are established. Twice a year the mills are given an advance rundown on order programs for the next six months.

Extreme Cutbacks Avoided — In last year's inventory liquidation, every effort was made to reduce stocks gradually. In some cases, abrupt cutbacks could not be avoided. But as much as possible, Westinghouse refrained from blanking out complete schedules.

By the third quarter of last year, the steel committee had decided on a program calling for an early buildup of inventory. Although steel operating rates were below 70 pct at the time and most predictions called for plentiful supply throughout 1958, Mr. Kennedy sees nothing remarkable in this early spotting of the shortage or in the decision that quick action was needed.

"Lead — Don't Follow" — All competent purchasing men knew what was coming, he says. The question of early action is equally basic, he feels. . . . "If you're going to protect yourself, you've got to get started before the crowd."

The difficulty, he feels, is that some purchasing departments may not have the support and confidence of management. In his own company, Mr. Kennedy is a member of the corporate administrative committee. When he submitted the inventory buildup program in the third quarter, it was adopted after only 15 minutes of discussion.

Buyers Get Word—Following the go-ahead from top management, word went out through line channels for steel buyers to protect themselves against a strike and to start their buildup as early as possible in the fourth quarter.

When detailed schedules had been drawn up, Westinghouse went to the mills and laid out its buying program. The mills were told how much of the tonnage was for current needs; they were told which portion was for future inventory and could be shipped with some leeway.

Some Were Ready — In many cases individual purchasing men were more than ready when the official inventory directive came through. Most had been thinking along the same lines.

The East Pittsburgh plant had never really cut plate inventories. It has run into chronic shortages ever since abandonment of the basing point system of pricing pushed supply sources farther away. In 1956 and 1957, it paid more than $2 million in premium charges for plates. For conversion of slabs, its extra costs averaged something over $80 a ton. For some lots of broker steel, it paid as much as $320 a ton, or more than $200 over the mill price.

The Big Picture—With this background, the plant in 1957 went to a new system of inventory management. Instead of establishing plate inventory levels on the basis of current use, it set up levels based on average use over a long period of time.

In terms of average use, the plant carries six months' supply of plates. In a period of low activity, this might actually be 11 months' supply. Mr. Riggs feels this principle is proving its soundness in the present situation. He knows the plan would have saved more than $4 million had it been operating over the past 10 years.

Savings Offset Inventory Costs—Compared to this saving, the carrying cost of extra inventory in slow periods is called negligible. Part of the carrying cost is offset by savings due to buying before steel price increases. Moreover, Mr. Riggs explains, the value of raw material inventory at East Pittsburgh is only about one-tenth the value of inventory in process. Because of the long

manufacturing cycle on many apparatus items at the plant, a brief shortage of raw material can be tremendously expensive in terms of process inventory tied up.

At the Sharon plant of Westinghouse, purchasing men S. E. Lauer, Jr., Manager of Purchases and Traffic, and C. W. Dierck, Purchasing Agent, have devised a different approach that is being considered for the plate problem. The Sharon plan is similar in that it involves carrying large inventories in periods of plenty in order to be sure of sufficient stock in a shortage.

How Sharon Plan Works — Sharon has taken the past 10 years and established a trend line for growth. Steel requirements for each year were based on the trend line. The buying pattern derived in this manner was then compared with the actual buying history.

Under the actual buying situation, it was necessary to buy 35,000 tons of steel at premium prices. The cost above mill prices was $2.4 million. Had the proposed method been in effect, premium charge would have been $486,000. Allowing for carrying charges, the proposed plan would have saved $1.9 million.

Feast or Famine — Both the Sharon and East Pittsburgh works make heavy electrical apparatus. They follow the extreme ups and downs of the capital goods cycle. In good times there is a rush for the limited supply of steel plates. Inevitably, equipment makers must turn to premium sources.

Other steel products are not subject to the same pressures. Sheet capacity has been expanded rapidly in recent years. Consumer industries do not fluctuate as violently as the capital goods field. Neither plant is thinking of applying radical inventory plans to products other than plates.

Plan Is Flexible—However, the plans can be modified to provide lesser degrees of protection. In the Sharon method commitments could be made for 90 pct of projected usage rather than 100 pct.

Wire Import Probe

▪ The government's tariff experts are in deep study of new data on imports of wire products.

Substantial evidence of the impact of foreign fencing, fence wire, and nails (see table, below) on U. S. producers was presented to the Tariff Commission in Washington last week by four firms—Atlantic Steel, Keystone Steel & Wire, Northwestern Steel & Wire, and Continental Steel.

Data Compared—The four domestic producers compared data on their shrinking share of U. S. markets with the gains registered by imported products in the same period.

Counsel for the domestic producers left no doubts in the minds of the Tariff Commission that the domestic industry has been affected by imports.

Union Opposition — Taking exception to the companies' testimony was Meyer Bernstein, international affairs representative, United Steelworkers of America, AFL-CIO. Mr. Bernstein said, in effect, the mills could meet foreign competition by cutting prices.

"Let these companies modernize their mills, adopt realistic pricing policies, and go after business as they did in years gone by," Mr. Bernstein told the commission. He conceded, though, that high wages paid U. S. steelworkers are an important factor in the picture.

Outcome In Doubt—While it is too early to tell how the commission will rule, the pattern of recent decisions is not encouraging to domestic producers. The tendency has been to favor importers.

All Tariff Commission recommendations are forwarded to the President for final action. The President may accept or reject the commission's recommendations.

What U.S. Mills Must Buck

	Import Price Per Unit	Domestic Price Per Unit	Pct Difference
6d Common Nail			
Milwaukee	9.40	10.20	7.8
Los Angeles	8.02	11.47	30.1
8d Common Nail			
San Francisco	8.15	10.95	25.6
8d Finishing Nail			
Detroit	9.20	10.84	15.1
8d Box Nail			
Houston	8.07	10.31	21.7
6d Galvanized Casing Nails			
San Antonio	11.09	13.69	19.0
1¼-in. Galvanized Staples			
San Antonio	10.63	11.82	10.0

Railroads Step-up Car Building

Move Gets Mixed Reaction from Steelmakers and Users

Rail users welcomed news the Pennsylvania and New York Central were going ahead with car building plans.

Still unanswered: How much strain will these new steel demands put on a market already tight.—By G. J. McManus.

▪ "When the operating rate hits 90 pct, watch for the railroads to start buying steel."

This prediction of several months ago was intended only as a joking comment on the railroad habit of delaying new construction until steel is tight and a traffic squeeze threatens.

As it turns out the figure of 90 pct comes close to pinpointing the spending revival. Late last month the Pennsylvania Railroad announced "an extensive freight car program" would start with the building of 11,500 cars.

Mixed Feelings—The New York Central also announced plans for building 2000 hopper cars. The Central has started a program of upgrading cars in bad order. Its subsidiary, the Pittsburgh and Lake Erie, has ordered 1000 hopper cars.

Word of these projects comes just as the steel operating rate is due to climb over 90 pct. The announcements have stirred mixed reaction from steel producers and steel users.

Help for Shippers—On the one hand, they are rooting for a quick rehabilitation of the freight car fleet. As of late February, carloadings were running 17 pct over the same period last year. The gap is due to widen rapidly.

The railroads have 25,000 fewer cars now than they had in February, 1958. They have 50 pct more cars up for repairs. They have 40 pct fewer new cars ordered.

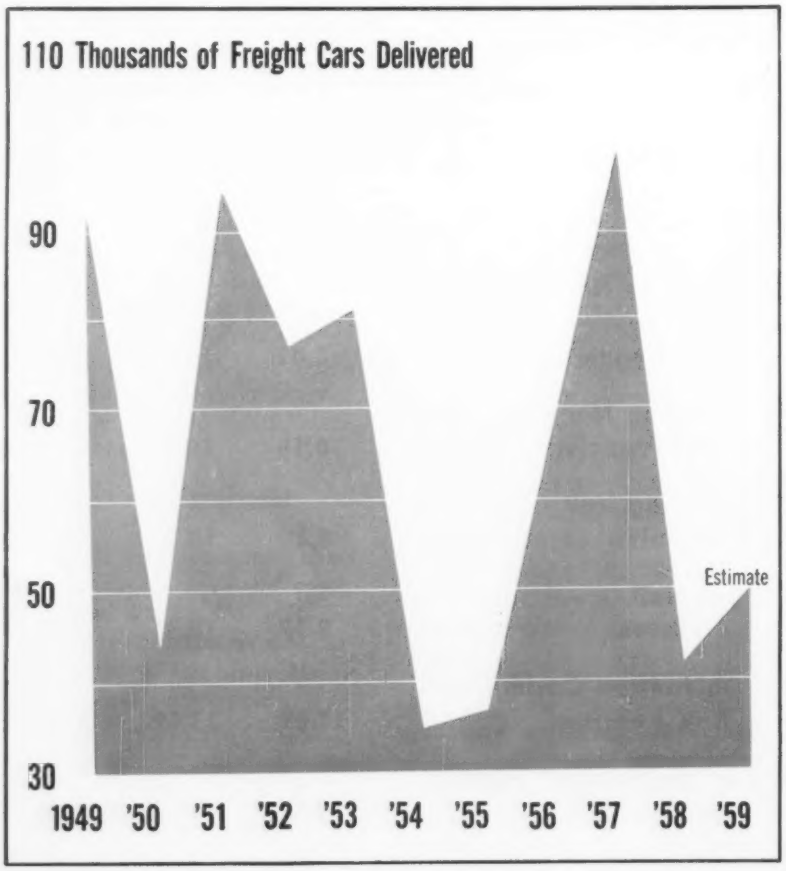
From this standpoint it is very much in the interest of steel users for the railroads to rebuild fast enough to maintain service.

. . . But Strain on Supply—On the other hand, a determined program of railroad construction would put pressure on a steel supply already strained. The railroads are one of the few market groups that have not contributed to the steel boom. The depressed state of railroad orders leaves room for one of the biggest jumps in steel volume.

Last year railroad orders for steel sank to a postwar low. Only 40,000 new cars were built (see chart). Only 700,000 tons of steel were shipped to car shops. In 1957 nearly 100,000 cars were built; over 2.7 million tons of steel were shipped to builders.

How Much Speedup?—Cars are currently being built at the rate of 24,000 a year. It is estimated the actual total for the year will be something under 50,000 cars. To meet this sub-normal goal, steel orders will have to jump from the present annual rate of 480,000 tons

Behind Looming Car Shortage



to a rate of 1 million tons a year.

So far suppliers are uncertain about the speedup in railroad spending. A mill with a general line of railroad products reports a sharp upturn but says order volume is still well below peak levels. A supplier of railroad wheels has felt only a mild improvement. Reports from independent car builders show a lack of enthusiasm.

Spending Timetable — Why do the railroads cut back so sharply in poor years and why do they delay so long in preparing for good ones? A big part of the answer is money. The Pennsylvania reported an operating loss of $360,000 in 1958. The New York Central had an operating loss of $3.9 million. The railroads say they simply do not have money to spend on new equipment in bad years.

Closely related to this deficiency is work volume. For the first seven weeks of 1958 carloadings dropped nearly 800,000 under the same period of 1957. The decline left railroads with cars standing idle. They felt no great pressure to order new ones. No other industry is expected to maintain instantaneous capacity for peak needs, argue railroad men; why should we?

Ups and Downs—As an example of the problem, the P&LE Railroad has 8500 idle cars out of a total 27,000 at this time last year. Despite this situation, the road maintained its building program. It installed 6000 new cars at a cost of $53 million in the 1957-58 period. It recently took delivery of 25 piggyback cars. It has ordered 1000 hopper cars.

During the past two years, the road spent $63 million on cars or double its gross revenues for the period.

At a recent count, the P&LE was loading a little under 10,000 cars a day. This is about 30 pct better than last year at this time. It is 30 pct under the peak loads of two years ago.

ON THE ROAD: Kaiser Aluminum has two, will soon have four, vans traveling around extolling aluminum conduit. The trucks have samples of conduit, accessories, and experts with their tools for demonstrations.

Aluminum Challenge

This Time It's to Steel Conduit

▪ Aluminum is gnawing on another steel market specialty—rigid electrical conduit.

Kaiser Aluminum led the latest and most serious thrust, a price cut that brought the aluminum conduit price to within 2 or 3 pct of steel. And the aluminum people feel that lighter weight and lower handling costs more than make this up on many applications.

In fact, Kaiser's Gillette N. Houck, promotion and technical development manager of the Electrical Conductor Div., predicts aluminum conduit will "command as much as 75 pct of the conduit market by 1965."

Less optimistic aluminum marketers will settle for 65 pct.

Steel's Domain—Steel has dominated the 400,000 ton-a-year market right from the start. Until last year aluminum, like copper, alloy steels and wrought iron, was restricted to a handful of special jobs. In January 1958, Aluminum Co. of America cut prices from about 40 pct more than steel to only 20 pct more. This brought more aluminum into use, but the total was still only a small fraction of steel sales.

Steel mills are not likely to drop electrical conduit from their product mix tomorrow. Even aluminum conduit makers say steel is superior where high strength is needed, and in many underground applications. Aluminum is going after the larger sizes where weight savings is particularly desirable, and in uses where corrosion resistance is a factor.

Target: Distributors — Distributors will be a major factor in aluminum conduit sales. In an unusual approach aimed at buyers on this level, Kaiser is sending out several mobile vans to demonstrate aluminum conduit to electrical contractors, utilities, plant electrical groups, as well as the distributors themselves.

A Formula Can Help You Decide

The problem of deciding whether to go ahead with a new product can give management some of its toughest moments. Frequently, a lot of money and prestige ride on the outcome. Here is a formula used by American Alcolac Co. for point-rating new product ideas. Projects are accepted or eliminated on the basis of this rating. The higher the points, the more feasible the project.

$$\frac{\text{Chances of technical success} \times \text{Chances of commercial success} \times \text{Estimated annual volume} \times (\text{price} - \text{cost}) \times \text{Market life}}{\text{Total Costs}} = \text{Project rating number}$$

Is That New Product Worthwhile?

The element of chance is kept to a minimum in modern research programs.

Here is a composite picture of how industry plans its new products.—By K. W. Bennett.

■ How good are the new product ideas coming from your research lab? And how well are you rating these ideas?

At an American Management Assn. seminar on new products, management field-stripped a number of new product research programs and came up with a full set of ground rules. Here are some of them:

Figuring the Budget—About 1 pct of the average U. S. sales dollar is spent on research. For some industries, the figure is as high as 10 pct.

Roughly two-thirds of research money is spent by companies who want to keep their existing products up with the competition. The remaining one-third goes into a nationwide, full-throttle hunt for new products.

Before Production—It takes an average of one to three years to bring a new product idea out of the lab and into the sales department as a fully-developed selling item. Field testing must be completed at least six months before even limited sales begin.

Immediately after the new product idea is born, market research is started to determine the product's probable life on the market, its sales potential, its resistance to recessions and seasonal trends. Eliminating low-profit products at the idea stage saves money in the research lab as well as for the company as a whole.

The Trends—To get maximum return on their investment in research laboratories, large companies are programming 85 pct of the research budget. Spending the remaining 15 pct of its time and dollars is left to the research laboratory—to follow ideas of its own that seem promising.

The trend is for a company officer to be designated vice president of research and development. He works with other officers in evaluating new product ideas coming from the lab, and ideas submitted by other sources.

Constant new estimates are made on cost of manufacturing, market potential, and patentability of the new idea. Only top-rated ideas are carried forward.

Ready to Go—A special "new products" division handles initial marketing and production of the new product. Once established, the new product is turned over to an existing division.

It's a tough game. One highly successful company that depends heavily on its research department keeps the average age of its research men between 32-35. The company feels it will get most new ideas from this age group.

Men at Work — Each research man has the room and equipment to handle several projects at one time. He is aided by one non-technical assistant.

The lab turnover is a high 10 pct, with the older men moving on into sales, engineering, or management positions.

Why the Tin Market Is Firm

Just About All U.S. Consumers Are Buying

Steel companies are the big factor as they are pressed to supply tinplate to their hedging customers.

Here's why tin now coming from Texas City could be vital. —By F. J. Starin.

• There's nobody left on the tin market fence these days.

Steel companies that produce tinplate are taking in metal at a rapid rate trying to satisfy customers hedging against a possible strike.

Buy Now—All tin users aren't booming along like steel. But steel companies are the biggest tin users. Customer tin inventories were at rock bottom. So when steel started buying big, no one could afford to take chances. Now everybody is building inventory.

Basically, that is the way the tin specialist for a major metals trading company sees the U. S. tin market.

It Can't Hurt—Most of the tin moving to customers these days is being used. Inventories are building up slowly. This means that if the experts are wrong and there isn't a steel strike, tin markets will lose only as much business as their customers cut operations. There'll be little business lost due to cutting of overstuffed inventories.

Another factor is starting to make itself felt on the U. S. market. U. S. traders don't like to talk about it because it is cutting into their business. But the tin being smelted in the U. S. at Wah Chang's Texas City smelter may help keep the roof on U. S. tin markets in the future.

This was once the world's biggest tin smelter. But little is known about its operations since it was sold by the government.

Costs Less From Texas—About a month ago large tonnages of Indonesian ore were reported moving to Texas City. The word now is that 4000 tons of high grade tin is being moved from a Chicago warehouse at less than prices being quoted by the trade in New York.

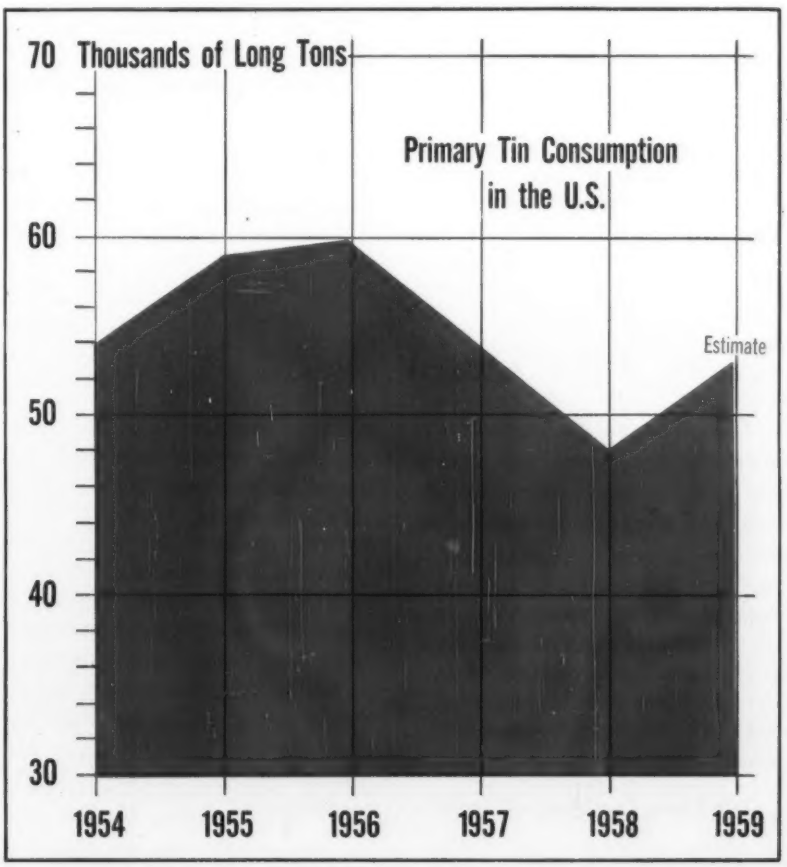
How hard is this hitting the usual supplier? Not hard yet, but it could. Here's a story told by one:

"One of my customers lives right near me. I did a lot of business with him in January. I happened to see him on a weekend, and I thanked him for his business, and said I hoped it would continue. He told me he had heard U. S. tin was becoming available soon at a good price, and you know, I haven't heard from him since."

At the last meeting of the International Tin Council, the amount of tin producing countries of the world may export in the second and subsequent quarters was expanded to 23,000 tons. In the first quarter they could only ship 20,000 tons.

The USSR will probably export about 13,500 tons, and there will be around 10,000 tons from assorted, uncontrolled sources. This still falls far short of the 140,000-145,000 tons that are likely to be consumed by world tin users in 1959.

Will There Be Enough Tin?



Libraries Save More Than Time

Company Libraries Make Business Reading Easy

"Must" reading has become a major chore of the modern businessman.

Special company libraries can save executive time, and show major cost savings.—By G. G. Carr.

▪ With all his other diverse duties, the businessman today finds it tougher and tougher to keep up with his required business reading.

This includes general business news in papers and magazines, new developments involving his particular field, and all the other published information that will help him do a better job.

To keep pertinent business information readily available in orderly fashion, a growing number of companies are starting their own libraries. These libraries have little in common with public libraries, are referred to as "special" libraries. Their function is to be an information and research center for specific areas of company activity, rather than comprehensive collections of general literature.

Services Rendered—Since most companies foot the bill for a wide range of literature to be circulated or routed, the special library has many advantages:

1. It will eliminate waste and unnecessary duplication of printed materials.
2. It will centralize the purchase of books and magazines bought anyway.
3. It will save money by making needed information readily available.

The special library should be diversified. But the backbone of the company library is the specialized business and technical literature bearing on the firm's activities.

Librarian Needed—Even more important to the special library than its books and magazines is the librarian. A properly staffed library has access to infinitely more books than it will ever contain. Generally, if a book is needed, a professional librarian can borrow it.

The company that pulls its librarian out of the secretarial pool and puts her in charge of the library usually gets high-priced clerical service and not much else.

A good company librarian functions far more as an all-purpose researcher than a book cataloguer. Charting the maze of specialized abstracts and bibliographies used in business and industry requires formal training at a high level.

Organizational Help — This is never truer than when the request is for "that long article on welding in one of the metalworking publications a couple of months ago." Through their professional organization, Special Libraries Assn., currently celebrating its fiftieth anniversary, special librarians have access to virtually any book or magazine as well as other services not open to the public.

How much does it cost to set up and maintain a special library? One expert estimates that a metallurgical library to support 20 researchers could be started with an initial investment of $5500, plus annual operating expenses of $11,600. Some experts put a figure at an average of $250 per researcher.

Costs Vary—Others point out that company libraries are highly individual affairs, so budgets for one company may be quite different from those of another.

As a service to companies considering starting their own libraries, Special Libraries Assn., New York, offers free one-day consulting service by a professional librarian familiar with the firm's industry. Consultation, including a written report, is free except for travel expenses. Lengthier consultations can be arranged on a fee basis.

Why You Can't Read It All

Miles Between Bookends—"It is reported that about 60 million pages of technical literature are published every year throughout the world.

"This is equal to 100,000 volumes of 600 pages each. At the rate of 10 volumes per ft, these would require new book shelving of 10,000 ft or just short of two miles." —Dr. H. Vagtborg, Southwest Research Institute.

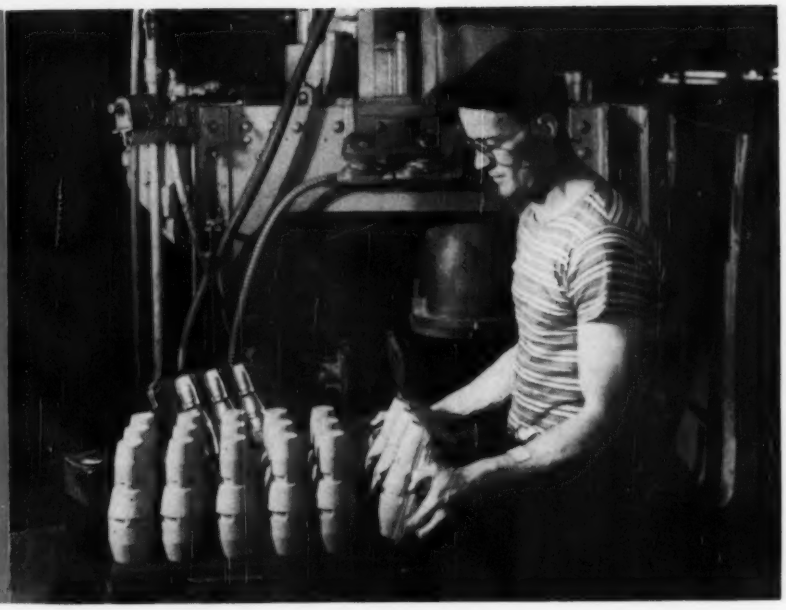
Ten Times Too Many—"Today's scientific literature is so large that one person can no longer read the output in one great branch of it, such as chemistry.

"If a chemist who could read about 30 languages fluently were to start reading all the papers of chemical interest published during 1955, and if he were to read four papers an hour, 40 hours a week, by the end of a year he would be more than 10 years behind in his reading."—C. L. Bernier, "Chemical Abstracts."

Gray Iron Castings Shipments

	Net Tons
1959	6,700,000*
1958	6,055,500
1957	7,786,229
1956	8,265,526
1955	9,156,253
1954	7,291,912
1953	8,449,837
1952	8,115,253
1951	9,573,347
1950	8,117,748

*Estimated



Job Shops Lift Castings Sales

Gray iron castings sales are showing renewed life, thanks largely to a step-up in job foundry output.

Active buyers are: Press builders, construction, farm and transport equipment makers. — By K. W. Bennett.

▪ With a big boost from job foundry sales, the gray iron castings market is rapidly reviving.

Current estimates place jobbing foundry output of gray iron castings at 650,000 to 675,000 tons a month. The job shops haven't hit this production level since late 1957.

Progress Report—Here's how job foundry activity has been moving so far this year: During January business indices were up 9 pct over December. This was double the usual January upswing.

The climb continued in early February although the industry normally falls off about 4 pct that month. Some founders, thanks to construction industry accounts, rode into March without noting a dropoff.

For others the pace slowed slightly as February waned. But these facts are important: Gray iron job foundries are generally running 20-25 pct over year-ago levels. Most shops are holding to a 4-5 day work week. Backlogs have moved up to an average four weeks, contrasted with the almost immediate delivery of six months ago.

Far From Record—While gains for gray iron are substantial, they are far from a record. In 1955, a 9 million ton year (see table) the industry was able to ship up to 850,000 tons per month. Compare this with shipments last year which dropped as low as 410,000 a month. And with the current estimate of 650,000 to 675,000 tons a month.

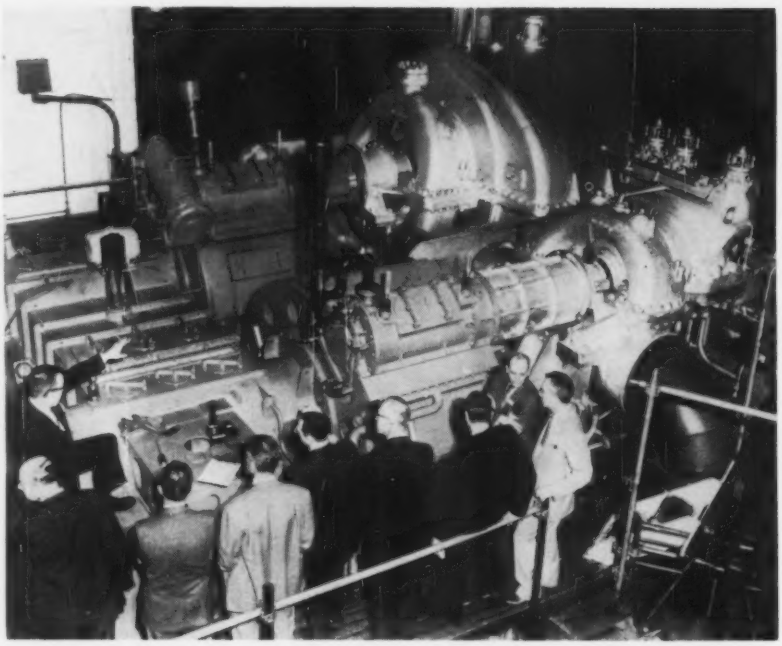
Selling More — But there's no denying the market now has many sources of strength. The building trades are absorbing castings at a strong rate. One jobber boosted his backlog to eight weeks through building trades accounts.

The press industry, another important castings market, is also more active. Machinery accounts, other than machine tools, are improved. And other buyers—construction equipment makers, farm machinery makers, and transportation equipment builders—are placing some orders in the job foundry market. Even a few machine tool builders have stepped up castings purchases.

And Buying More—The upsurge in gray iron foundry orders is reflected in the industry's raw material purchases. Suppliers say their business with founders is excellent. Some of the pig iron and coke being bought is undoubtedly an inventory hedge against a steel strike. Foundrymen are often trying to wedge all their buying for nine months into the first half of the year.

But the level of foundry operations indicated a lot of the material is used for current production.

Power for First Atomic Ship



ATOMS AWEIGH: Officials of the Atomic Energy Commission, Maritime Administration, and newsmen view the main propulsion machinery for the world's first atomic surface vessel, the N/S Savannah. Testing is being done at the De Laval Steam Turbine Co., Trenton, N. J., before the equipment is delivered to the New York Shipbuilding Corp., Camden, N. J., for installation. All goes well. The atomic vessel is expected to carry its crew of 120, 60 passengers, and 10,000 tons of cargo for about 3½ years without refueling. Normal speed will be about 20 knots.

Unemployment Pay Law Likely to Be Extended

A Democratic bid to whip through an extension of the federal emergency unemployment compensation program for another year appears likely to succeed.

The surprise proposal, introduced only last week, was scheduled to come up for consideration before the House Ways and Means Committee late this week. Its Democratic sponsors, particularly Rep. Theodore Machrowicz (D., Mich.), are driving for approval before the March 26 Easter recess. Payments to unemployed, under the present program, would end April 1.

Blocking Bill—The only snag to possible passage appears now to be Sen. Harry F. Byrd (D., Va.), chairman of the Senate Finance Committee and a powerful fiscal conservative. Republicans are ready to fight, but they don't have the votes to stop the steamroller if it gets moving.

Under the program, passed last year during the height of the recession, states can borrow funds to increase their unemployment payments by 50 pct. A worker in a state with a 26-week program can thus continue receiving them for another 13 weeks. Some 21 states, which account for most of the unemployment, have used the program.

Welding Rod Price Cut

Welding rod sales levels are advancing, but prices are headed the other way. A. O. Smith touched off the 1959 campaign by announcing a 12 pct slash on lots of welding electrodes over 40,000 lb.

Savings will be felt first by large buyers which order carload lots direct from the producer, but the impact will spread further. Distributors will be able to buy in 40,000 lots at the 12 pct markdown. A. O. Smith figures this will improve distributor profit margins on their own small lot sales.

Timing—The price cut comes when the welding rod industry is headed into a strong sales year. Welding electrode shipments are expected to hit about 530 million lbs this year, a 16 pct gain over the 455 million lb shipped in 1958. The Post-World War II peak was 1956, when 645 million lb were shipped.

Court Rules an Office Isn't Necessary

Industrial companies are threatened with a heavier burden of state taxes, following new U. S. Supreme Court actions.

A company may be taxed by a state even though it maintains no offices, and stocks no products there, the Supreme Court now rules. Tax liability can stem from the mere taking of orders within a state, the court decided in a case involving Brown-Forman Distillers.

In Question — Brown-Forman had appealed a Louisiana court finding that state taxes apply to the corporation's income from sales in Louisiana. The corporation emphasized it derives its business in the state from representatives who travel there to take wholesale orders. These are approved or turned down by the firm's home office in Louisville, Ky.

The Supreme Court has upheld the state's authority to tax though Brown-Forman operates no sales office in Louisiana. This goes a step beyond the court's recent decision in the case of taxes levied by Georgia on Stockham Valves and Fittings, Inc.

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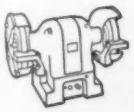

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Horace W. Whitman

One Man With Two Viewpoints

If you think you see things differently at work than you do at home, don't be alarmed.

It happens to the best of men. Mr. Whitman, for instance, has no trouble adjusting.

▪ There's a little bit of dual personality in most of us, and Horace W. "Bucky" Whitman, vice president and general manager of Torrington Mfg. Co.'s Machine Div., is one of the bunch.

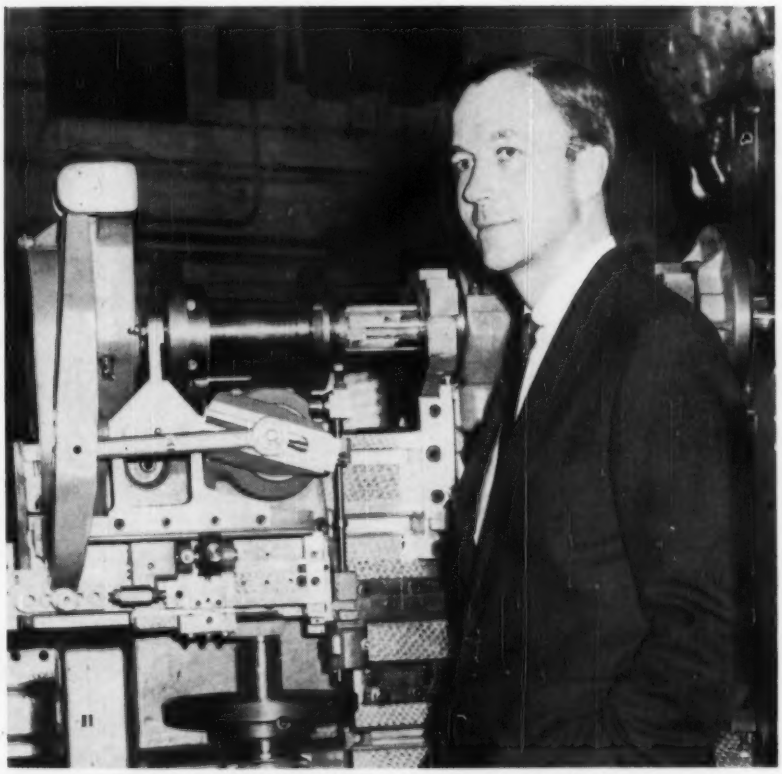
Mr. Whitman lives in a 220-year-old house in Avon, Conn. He carefully avoids remodeling the house "since it's gotten along by itself for so long."

The Other Him—But once he leaves home in the morning and goes to work at 75-year-old Torrington Co., his outlook undergoes a metamorphosis. New ideas replace the old.

Senior employees at Torrington will tell you that the Machine Div. has undergone radical change since Bucky Whitman took over as head man five years ago.

Standards Set—He is stirring up competition in a field where two years ago the division had no products at all. Seventy percent of the company's output has swung over to wire and strip-forming machinery. Only 15 years ago, special milling machinery accounted for 75 pct of production.

His first big step was to standardize Torrington's products and production methods. He proved that special features could be added to a basic machine without need for custom designs. And he proved it could be done without sacrificing the company's reputation for craftmanship.



H. W. WHITMAN: Business and antiquity don't mix.

Recently, the company installed the first completely automatic high-speed, flat wire mill for production of transformer cables.

He's Anti - Committee — While much of Mr. Whitman's management thinking is in common with other metalworking executives, he follows two rather rare principles. He doesn't believe in committees and he feels good management doesn't require long hours.

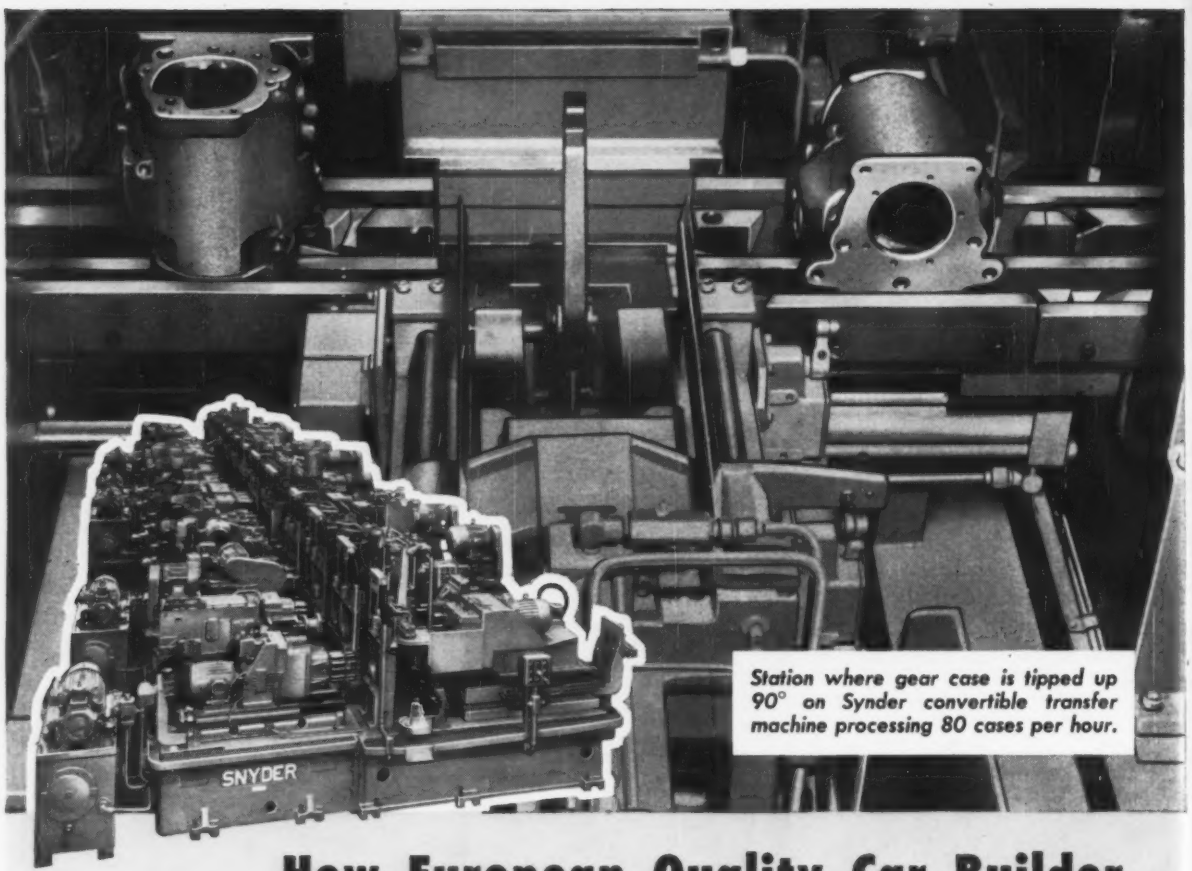
Wide participation in management decisions is desirable, he feels, "but not in committees."

Plans His Work—In regard to the long executive work-week, he feels that the manager's job can't be measured in hours.

"I used to put in a 60-hour week and bring work home, but gradually we've found that it's possible to do the job in less time with a little more careful planning," he explains.

His Background — Mr. Whitman was brought up in Baltimore. He played varsity hockey at Princeton and later in a semi-pro league in California before entering the Navy. He was executive officer aboard a minesweeper in the Pacific during World War II, taking part in the Aleutian and Okinawa campaigns.

After the war he returned to Princeton and was graduated in mechanical engineering. He worked for Hamilton Standard in Hartford before joining Torrington in 1949.



Station where gear case is tipped up 90° on Synder convertible transfer machine processing 80 cases per hour.

How European Quality Car Builder Snyderizes for the Soaring Sixties

This new 53-station transfer machine combines special purpose efficiency with high convertibility for later changes. Part orienting devices enable Snyder to utilize standard horizontal way-type units to drill, spotface, chamfer, ream, line-ream, mill and bore this cast iron standard gear transmission case on all faces. The cases are turned 90° at the thirteenth station and tipped up 90° at the thirty-eighth station, which eliminates vertical machining units. The part is specifically located on faces not subject to future design changes, thus reducing future capital expenditure.

* * *

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Budget Needs Profitable Business

Corporate profits are no longer a sitting duck for congressmen and others in the anti-business group.

Corporate income taxes are a major factor in government revenue. A one-third increase is needed if budget is to be balanced.

▪ You're going to see less sniping at business profits, even from the liberal group. The reason? It's an unavoidable fact that Federal financing relies heavily on corporate profits for a major share of its revenues.

Even those who usually take an anti-business stance now realize that profits have to be maintained at a good level. Otherwise, the budget, which isn't going to be balanced anyway, can get entirely out of hand.

Record Year Needed—For example, the Administration's budget calls for a yield of $21.4 billion from corporation income taxes. This is based on anticipated profits of $47 billion. This contrasts with actual profits of about $36.4 billion in disappointing 1958 and means a 34 pct increase is needed.

The record year for corporate profits was 1956, when they reached $45.9 billion. Most economists believe the yield expected this year is a little high. So with Congress determined to go ahead with spending plans higher than the Administration's, criticism of business isn't likely to be bitter.

Cost of Financing—It goes a step beyond mere balancing the budget, that fiscal detail which has never given Congress much cause for worry before. But it does now. Congressmen who gave little or no thought to deficit spending a few years ago are now paying it more than lip service.

The reason here is that the cost of deficit financing is going sky high. The rates of interest the U. S. Treasury must pay today for both short and long-term financing are beginning to worry the biggest government spenders.

Effects Spread — In short, the government's stake in corporate earnings is becoming more and more apparent. Since business profits can make the difference between a good or bad year for the government's receipts, there will tend to be less knocking of the profit system, and of good company earnings.

And, while it isn't likely to be admitted out loud, this line of thinking is extending into labor. Congressmen and Senators who have long pushed hard from labor's side are making sounds that show some sympathy for the need of showing a profit as well as paying out wages.

A Change for the Better

▪ You will have to go to the "adjusted" figures to get much of a boost out of January indicators.

Since January is traditionally a letdown month for consumers, decreases in sales of most products are expected. This January was no exception for most, but declines were less than seasonal.

How Adjustments Work—Manufacturers sales actually dropped in January from $28 billion in December to $27.3 billion. But the adjusted figure reached $28.2 billion, showing a moderate increase over December's adjusted $28.1 billion.

In the durable goods industries, sales dropped slightly. But adjusted for seasonal factors, durables' sales gained from $13.6 billion in December to $13.7 billion in January.

New orders continued to hold a pace slightly ahead of sales. New orders for all manufacturing held at $28.4 billion in January with a slight gain in durables making up for a moderate decline in nondurables.

One thing to note in both adjusted and unadjusted columns is the rise in manufacturers' inventories. All of the January gain in stocks occurred in the durable goods industries.

Durable goods manufacturers were able to boost their stocks by $300 million during the month as the inventory buildup finally got under way.

Auto Paper Leads Instalment Credit

Another indicator, instalment credit, did a similar acrobatic. Unadjusted, instalment paper declined $97 million in January. But adjusted for seasonal factors, it gained $387 million.

Auto paper gained in both adjusted and non-adjusted columns, reflecting the better-than-seasonal increase in auto sales.

BIG, NEW ADDITION

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NEW MULTI-KUT

FLAT

This MULTI-KUT FLAT file is similar in shape to the Regular Flat File. Fast cutting, it leaves a smooth finish and gives good results on any fileable material. Furnished in 8", 10", 12" and 14" lengths.

NEW MULTI-KUT

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This MULTI-KUT HALF ROUND combines two exclusive SIMONDS file designs: Multi-Kut on the flat side, Spiral Cut on the radius side, resulting in rapid, smooth finish filing of either flat or concave surfaces or for rounding out holes. Furnished in 8", 10", 12" and 14" lengths.

NEW MULTI-KUT

SQUARE

Cut on all four sides and tapered toward the point, this fast cutting MULTI-KUT SQUARE file is especially useful in slots, keyways, splines, square holes and general surface work. Furnished in 8", 10", 12" and 14" lengths.

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The Simonds' line of files — files that cut fast and smooth, last longer; files that bring *smiles of satisfaction* are now even more complete with the addition of Simonds' new design Multi-Kut — in three shapes, four lengths.

The new diamond formation chip breaking grooves and varied shapes make the Simonds Multi-Kut an extremely useful all-around file for maximum stock removal, smooth finish and long life on any fileable material.

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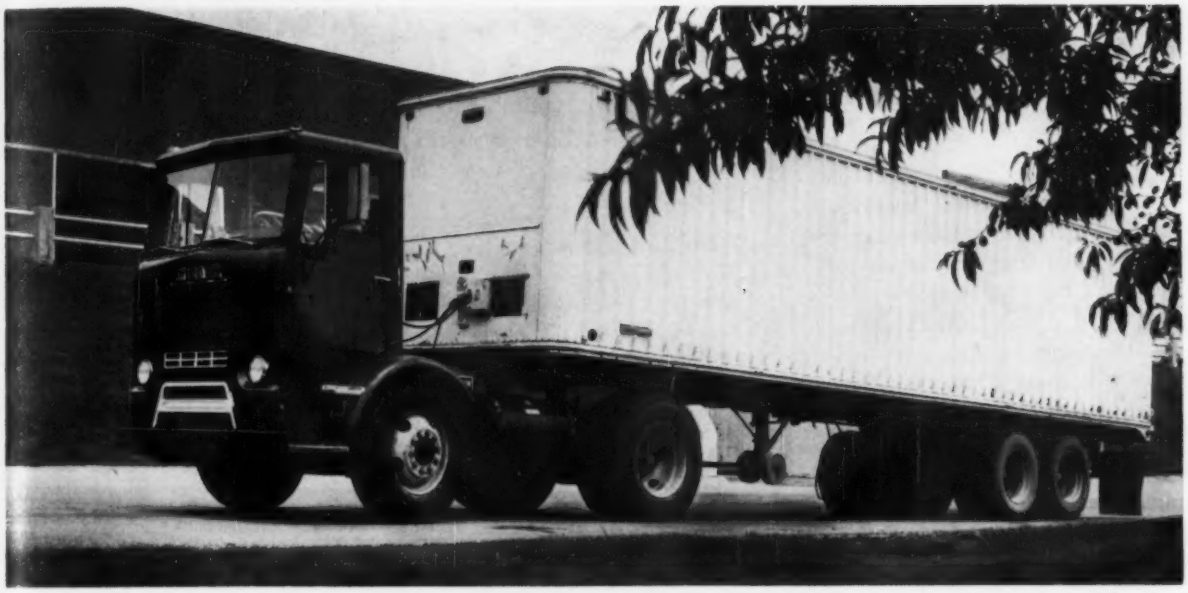


IT'S LIGHTER: New GMC tractor saves 700 lb with aluminum tilt-cab, fabricated frame, fiberglass fenders.

Lightweight Trucks Are Coming

Heavy-duty truck builders hope to lop off deadweight by using aluminum, plastics.

The reducing fever is expected to spread to smaller truck makers soon.—By H. R. Neal.

▪ A design revolution in the truck manufacturing field appears to be in the making—and for much the same reason passenger car manufacturers, with an eye on the success of small cars, are pushing their efforts to reduce the weight of their products.

In a truck it is estimated that a saving of 1 lb is worth at least $1.00 per year, and if the truck operates in hilly country it's worth even more, according to a component supplier to truck manufacturers.

Tractors Are Next—Like everyone else, truckers are feeling the pressures of inflation. Unless the payload goes up, the only way to offset higher costs is to raise hauling rates. The highly competitive nature of the trucking industry tends to discourage wholesale rate increases.

Trailer manufacturers have led the way in recent years in reducing the weight of their products through redesign and increased use of lightweight materials, principally aluminum, one truck manufacturer admits.

That leaves only the tractor as the last possible place to make "significant" reductions in weight. There is plenty of evidence that drastic weight reductions can be made and are likely to be incorporated in future design plans.

Chrysler's Bid—Recently, Chrysler Corp. announced it had designed and built a lightweight, all-aluminum truck for the U. S. Army. While details remain sketchy until the firm demonstrates the vehicle next month, Chrysler has revealed some dramatic teaser data.

It says the new truck, utilizing unitized construction, is 2.5 feet shorter and weighs some 5000 lb less than comparable Army trucks. It can float with a load of 5000 lb. Over cross-country operations it can carry two-thirds of its own weight in men and weapons as against one-third to one-half by vehicles now in use.

Adaptable to Commerce—It is unique as a military vehicle. It has eight independently suspended wheels giving it the "versatility of a tank." The truck, along with a 4-wheel and 6-wheel version, has been designed to make use of existing production facilities for a number of components.

Significantly, the manufacture of the new vehicle "can be readily adapted to commercial techniques

and processes," Chrysler engineers say.

Truckers have made heavy-duty truck manufacturers very conscious of the weight penalties in large tractors. At the same time the truckers have let it be known they like their big tractors to look big.

GMC Makes Headway — For commercial vehicles, heavy-duty truck manufacturers have taken the lead in reducing the weight and length of their big tractors.

GMC Truck & Coach is currently demonstrating two new diesel-powered models to its dealers across the country which will enable truck operators "to carry from 699 to 2097 lb more payload than with comparable competitive models," the company says.

Better Frame Design—A new type frame design provided up to 300 lb weight savings over conventional pressed-channel type construction. Although the fabricated frames weigh only half as much as the channel type, their SAE 950 high tensile steel, and welded construction make them stronger and more rigid.

Aluminum is used throughout the cab framing, heavily reinforced pressed floor, welded and riveted exterior roof and back panel, and door assemblies. Further freight savings are obtained through use of fiber glass fenders, head lamp panels and lattice type grille.

White Uses Plastics—White Motor Co. offers tilt-cab trucks made of fiber glass reinforced plastic. One reason is light weight. A piece of fiber glass reinforced plastic 12 in. x 12 in. x 0.010 in. weighs 0.90 lb. A piece of 20 gage steel of the same size weighs 1.5 lb, and aluminum in the same size and 14 gage weighs 0.93 lb.

While production costs are higher with fiber glass construction than with other materials, tooling costs are considerably lower. Molded Fiber Glass Body Co. says the cost to tool the White cab body, including engineering costs, was less than $500,000. In steel, it would have cost an estimated $2 million to $3 million, the company says.

Aluminum Used Freely—Certain wear points are made of aluminum, as are the upper window channels. And the grille is perforated aluminum sheet. An under-frame of high-tensile aluminum extrusions is bolted to the floor of the cab and the front and rear in 49 places.

Autocar Div. of White Motor Co. is offering a new "A" series of highway tractors said to save up to 25 pct in tractor weight compared to standard vehicles.

Lighter Diesels Coming — The Autocar features a rugged aluminum frame. An all-aluminum cab consists of an aluminum skin over a girder-type frame of aluminum alloy. The front bumper is three-ribbed, pressed-channel aluminum construction. Liberal use of aluminum is made elsewhere, including the wheels. Diamond T. offers tilt-cab tractors with similar aluminum features.

Even diesel engines will be going aluminum. Detroit Diesel Div.'s new line of engines will eventually include optional aluminum blocks. The company has introduced an engine in the 210-hp range weighing only 1770 lb, about nearly 700 lb lighter than previous models in that range.

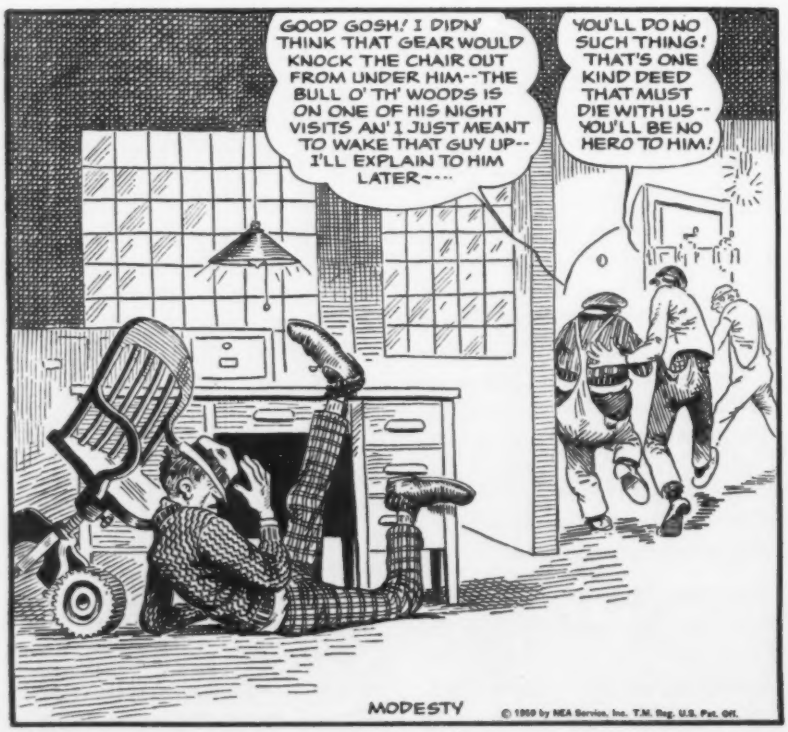
Others Must Follow—Most truck manufacturing volume is still among the light and medium range vehicles. But truckmakers in this area admit the heavy-duty specialists have started a trend they'll have to follow before very long. The pressure for more payload, they say, is being felt all of the way down the line.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Mar. 7, 1959	133,363	23,363
Feb. 28, 1959	127,783	25,104
Mar. 8, 1958	83,892	17,523
Mar. 2, 1958	91,508	17,451
TO DATE 1959	1,157,603	221,154
TO DATE 1958	965,418	173,309

*Preliminary Source: Ward's Reports

The Bull of the Woods


GOOD GOSH! I DIDN' THINK THAT GEAR WOULD KNOCK THE CHAIR OUT FROM UNDER HIM--THE BULL O' TH' WOODS IS ON ONE OF HIS NIGHT VISITS AN' I JUST MEANT TO WAKE THAT GUY UP-- I'LL EXPLAIN TO HIM LATER----
YOU'LL DO NO SUCH THING! THAT'S ONE KIND DEED THAT MUST DIE WITH US-- YOU'LL BE NO HERO TO HIM!
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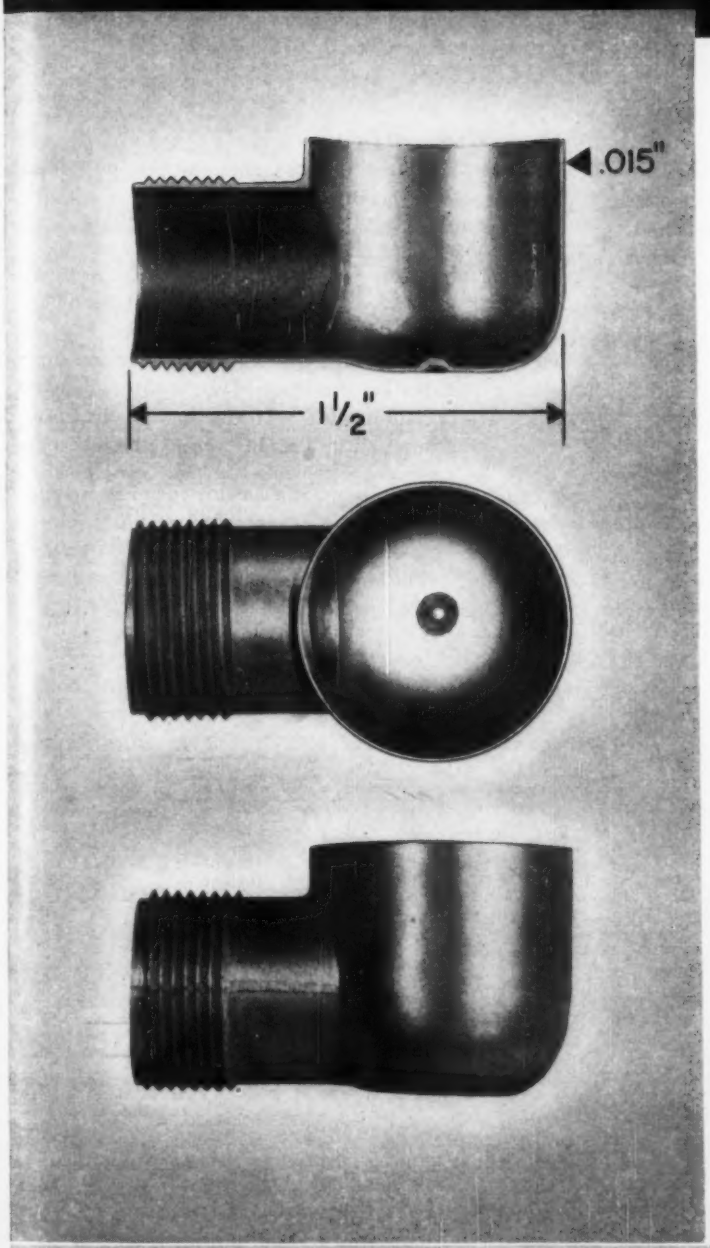
IT'S LIGHTER THAN YOU THINK!



AND STRONGER, TOO,

WHEN DIE CAST with

ZAMAK

This thin-wall spark plug shield is a zinc die casting with minimum wall thickness of only .015".

Many zinc die castings are as thin as stampings, yet can be produced in shapes that cannot be duplicated as one-piece stampings.

More and more, engineers are learning that they can design parts for ZAMAK alloy die casting that will compete with either steel stampings or castings of the lightweight metals—and at lower cost.

THE NEW EDITION OF "END USES OF ZINC DIE CASTINGS"

SEND FOR YOUR COPY TODAY

HORSE HEAD® SPECIAL ZINC AND HORSE HEAD ZAMAK ARE PRODUCED BY

THE NEW JERSEY ZINC COMPANY

DEVELOPERS OF THE ONLY STANDARD ZINC DIE CASTING ALLOYS IN USE TODAY

160 Front Street · New York 38, N. Y.

HORSE HEAD PRODUCTS ®

There are cheaper ways to heat treat metals . . .

BUT NOT WHERE YOU NEED *Precision* RESULTS

ON A MASS PRODUCTION BASIS!

When heat treating requirements are not in the least critical, there are probably cheaper ways you can handle them than in salt. But when highly precise results must be obtained—economically, with a minimum of labor cost—then salt baths offer possibilities that cannot be overlooked.

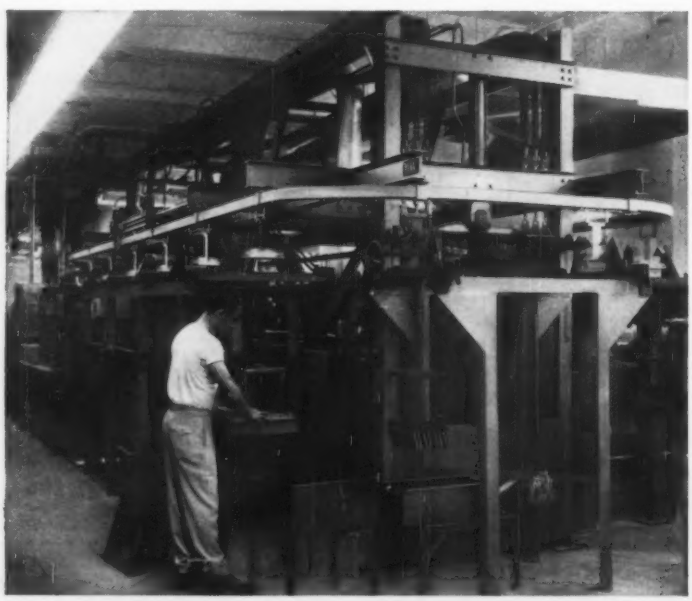
It is now common practice to handle on a salt bath mass-production basis, heat treating so ultra-precise that it may have been regarded as a laboratory method not many years ago.

Moreover, extending far beyond their obvious advantages in hardening steels, salt baths have "come of age" in many different directions.

These range from isothermal processing to heating for forging; from aluminizing to various types of brazing including aluminum and magnesium brazing; from simultaneous carburizing and brazing to heat transfer applications and others which cannot yet be discussed.

Metal fabricators long ago learned to come to Ajax, not merely to buy furnaces, but to enlist specialized heat treating and metallurgical help in solving specific problems; or in improving, economizing or modernizing specific heat treating processes. This has brought Ajax in close association with heat treating requirements, trends, procedures and possibilities over a broad front.

In numerous instances, it has made the ultimate purchase of Ajax equipment incidental to establishing new and better ways of doing things; or of handling critical heat treating jobs to new, higher standards of precision, quality, and economy.



MECHANIZED AUSTEMPERING—Typical of the trend toward salt bath mechanization, this Ajax installation in the Hartford, Conn. plants of the Royal McBee Corporation austempers type bars. It has materially increased production, saved time and improved quality of the parts.

AJAX

HULTGREN

SALT BATH FURNACES

Internally heated electric and gas-fired types

The most efficient heat treating principle for a wide variety of work . . . Pioneered by Ajax in the largest line of furnace types, shapes and sizes for modern production needs.

AJAX ELECTRIC COMPANY

904 Frankford Ave.
Philadelphia 23, Pa.

Associates: Ajax Engineering Corp., Ajax Electrothermic Corp.

LEADERS IN SALT BATH PROGRESS SINCE 1936

Do We Face a U.S. Sales Tax?

It's "Inevitable," Asserts Washington Tax Attorney

We need more money to pay for the cold war, says tax advisor Joel Barlow.

The only tax we haven't tried yet is the national sales tax. —By G. H. Baker.

▪ It looks like we may be paying a national sales tax in the not-distant future. Joel Barlow, a leading Washington tax attorney, believes such a levy is "inevitable."

"Eventually, there will have to be another tax to pay for the cold war," Mr. Barlow predicts.

(Most of Mr. Barlow's clients are machinery manufacturers. He also counsels the U. S. Chamber of Commerce on tax matters.)

Not Yet—However, Congress is not disposed to face up to federal revenue problems brought on by the cold war until the situation becomes worse. There is general agreement among leaders in both the Senate and House that income taxes—both corporate and individual—are producing optimum yields.

To tap the public for any substantial new revenue Congress would have to mine a new vein. And a national sales tax represents the last remaining untapped source.

Milked Dry—"We have now exhausted the maximum possibilities of both corporation and personal income taxes," Barlow declares. "Further increase in rates would not bring in any substantial amounts of new revenue. Even increasing the top bracket of the personal income tax to 100 pct would not even produce $1 billion," he calculates. "The potentials of income taxes are finished."

In order to pay for national defense, Mr. Barlow believes Congress will have to enact some kind of sales tax. A rate of about 1½ pct on all products, except food, clothing, and medicine has been proposed by Vice President Nixon. Mr. Barlow says this rate would be "about right."

Union Spending Probe

The Senate anti-rackets committee plans another look at unions' political spending.

The committee is especially interested in union spending to kill the right-to-work proposal that was on the ballot in several states last November. Voters killed it by a wide margin. But some senators wonder how much dues money was spent by unions to defeat right-to-work.

Secondly, there are complaints before the Senate committee that unions are threatening some rank-and-file members who signed right-to-work petitions.

Tomorrow's Markets

Add up the new trends reported by the U. S. Census Bureau and you have a hint of tomorrow's markets.

Here are some of them:

There is a tremendous increase in the number of children in both elementary and high school age brackets.

The slowest growing age group is working adults, ages 18 to 64.

There are now about 6.8 million households in the U. S., 16 pct more than in 1950. The population has grown about 15 pct in that time so as a nation we are setting up households faster than we are growing.

Complete details are in Current Population Reports, P-25, 193, 194, Census Bureau, Washington 25, D. C. Cost is 35¢.

Pressure for New Merger Law

No Secrets Please—There's heavy pressure in Washington for a new federal law requiring notice of any intent to merge.

This has been debated by both Senate and House each year for the past several years. But strong opposition always blocked approval.

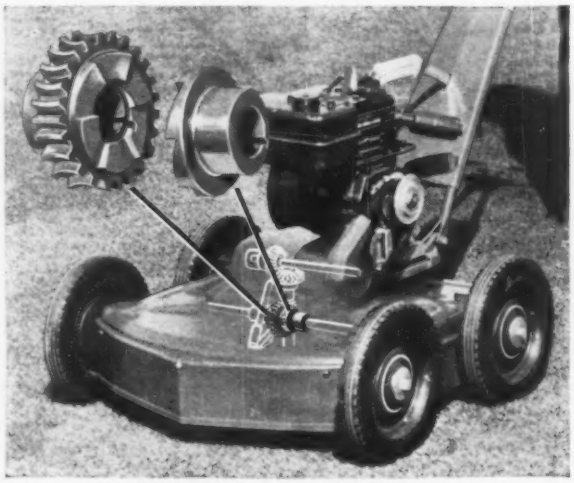
All for It—This year, chances for passage of the so-called "premerger notification" bill are much stronger. Support comes from both political parties. And the Eisenhower Administration advocates such a law, is actively urging its enactment.

As the premerger notification bill now stands, companies must file with the Federal Government any notice of intention to merge at least 60 days before the planned merger.

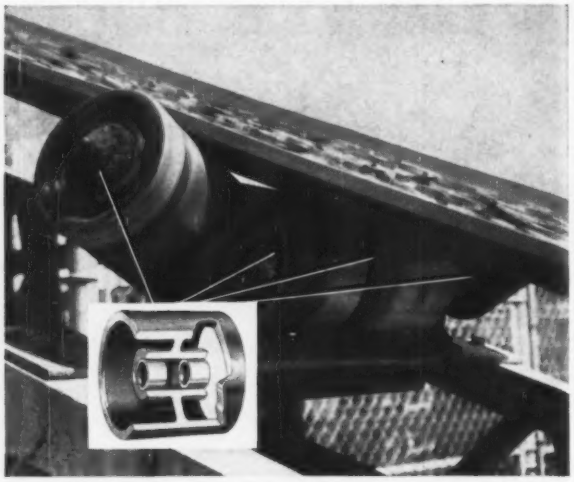
Forewarned Is Forearmed—The government, through either the Justice Dept. or the Federal Trade Commission could then seek a court injunction to block any proposed mergers it believed would cause "substantial lessening of competition."

All mergers involving combined assets of $10 million or more would come under the bill now under discussion.

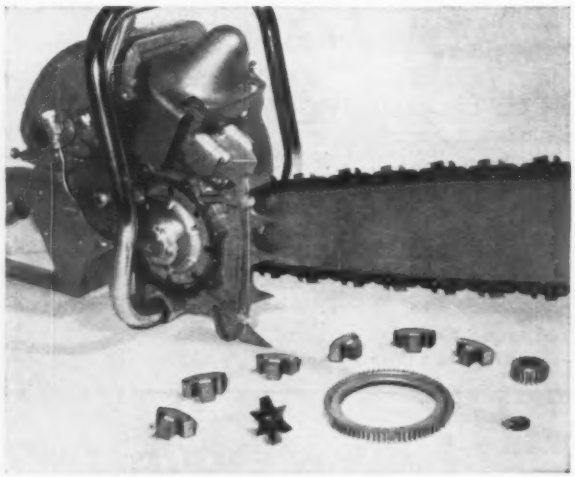
BOOST PRODUCT APPEAL with OILITE



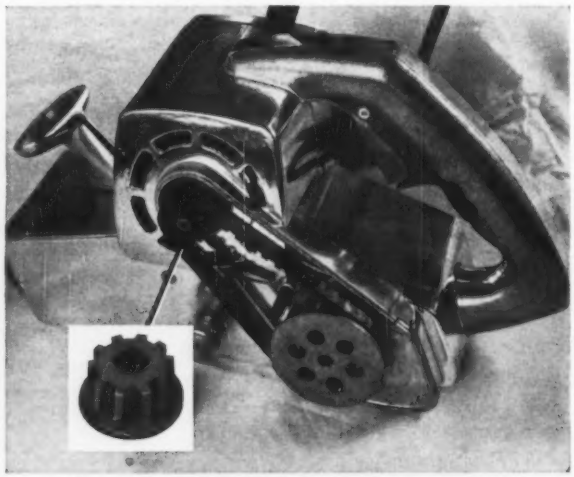
These 2 Oilite components now do the work of 4 former machined parts . . . contribute new economy, less upkeep.



Not one "squeak" from this conveyor . . . yet the dirt-encrusted Oilite bearings haven't been lubricated in 7 years.



Tough, wear-resistant Oilite gears, sprockets and clutch shoes keep costs low . . . make power saw more dependable.



The Oilite pulley of this heavy-duty belt sander provides yet another example of improved performance at less cost.

Quality-built OILITE®* parts and bearings add sales appeal to many fine products. For one thing, close tolerance Oilite parts wear less, weigh less and are quieter running . . . and Oilite bearings are tougher, maintenance-free.

* *Only Chrysler Makes Oilite*

For another, Oilite components drastically reduce cost by eliminating material waste and costly machining. Why not contact your Oilite representative today? Look for him in the Yellow Pages under "bearings — Oilite" or write Dept. R-3.

PM MEMBER SINCE 1929

A CHRYSLER OILITE PRODUCT

the most trusted name in powder metallurgy!

AMPLEX DIVISION

CHRYSLER CORPORATION, DETROIT 31, MICHIGAN

SELF-LUBRICATING BEARINGS • PRECISION PARTS • METAL FILTERS • FRICTION UNITS

Air Force Cracks Down on Costs

Avoid Inaccurate Estimates, Contractors Told

Check on completed contracts shows difference between prices bid in and those current at the time.

If overpricing continues, Air Force Materiel Chief warns, pre-auditing of bids may be necessary.—By R. R. Kay.

▪ If you're working for the Air Force, watch your costs.

From now on, when a company bids for a contract, it had better make sure its proposed costs are factual and accurate. Estimates, no matter how valid, are not enough.

Found by Audit—"Over the past months," says U. S. Air Force Lt. Gen. C. S. Irvine, Deputy Chief of Staff, Materiel, "post audits of contracts have pointed up some serious discrepancies between actual costs which were current at the time of the contract negotiation and the prices submitted with the bids.

"Whether these differences resulted from honest mistakes or from expected price increases is not important. The fact that the discrepancies were not explained or corrected makes them suspect."

Put It in Writing—Air Force contractors must now certify in writing that quoted prices are actual costs.

"This problem is serious and immediate," Gen. Irvine warns. "While there are no implications that fraud or deliberate malpractice is taking place, there is sufficient evidence of 'errors' to warrant corrections now. If overpricing continues, the Air Force may find it necessary to conduct pre-audits of proposals."

So, if you're a prime contractor, or working for one, make sure you know the Air Force's pricing practices.

General Irvine told aircraft industry leaders on the Coast they should plow back part of their profits into the national research program.

Farwest Power Swap

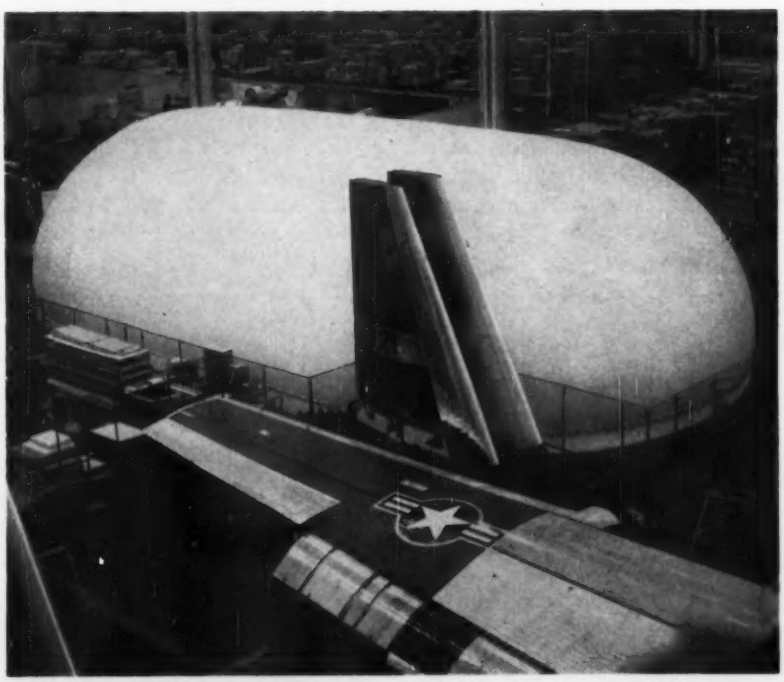
An electric power tie-in between the Pacific Northwest and California is coming.

It will be a two-way street. At times during the year the power-producing Northwest can't use up all its generation. Happily, those are the times of year that California's power supplies are way down.

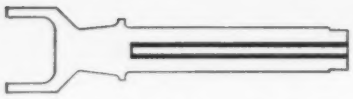
In the late fall the opposite is true. California has surpluses and the Pacific Northwest is short.

Interchange of power will mean both areas can develop faster. Now they're having a tough time keeping up with peak needs in periods of low water supply.

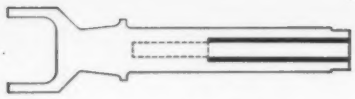
Giant Mushroom Houses Researchers



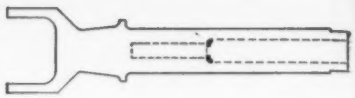
LESS DUST, BETTER AIR: There's a reason why this 20-ft high nylon-plastic tent is situated inside the Lockheed Aircraft Corp. plant at Marietta, Ga. It's the filtered work area for researchers perfecting fabrication techniques for fuselages of Air Force B-70.



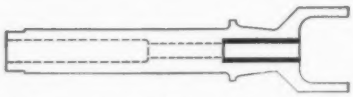
1. Solid bore—feed 5¾" per minute.



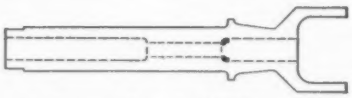
2. Counter bore—feed 8" per minute.



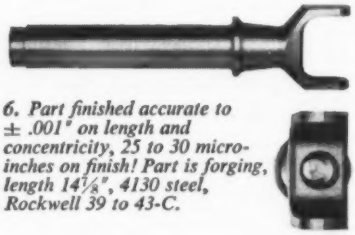
3. Form radius—feed 5¾" per minute.



4. Reverse part, solid bore—feed 5¾" per minute.



5. Form radius—feed 5¾" per minute.



6. Part finished accurate to ± .001" on length and concentricity, 25 to 30 micro-inches on finish! Part is forging, length 14⅛", 4130 steel, Rockwell 39 to 43-C.

This horizontal pin machined

8 TIMES FASTER . . .

on the Rapid Borer

Formerly, this aircraft part was rough drilled, reamed, radius formed, ground and honed. Operation called for turret lathe, grinder and honing machine. Even with experienced operators, incidence of spoilage was high because of precision requirements.

On the LeBlond-Carlstedt Rapid Borer, there is only one set-up. Part is completed, *finish bored* in 5 simple operations. Cycling is automatic. Workpiece spoilage is down. Operation is so simple that unskilled operators are quickly trained. Currently 2 different sizes are being produced in lots of 300 to 400.

LeBlond-Carlstedt Rapid Borers will solid bore, trepan or counterbore holes 3 to 8 times faster than by the conventional D-bit method! Hole capacity from 5/16" to 4¼" diameter. Handles symmetrical work—round, square, octagonal, tapered or stepped—wide variety of hole diameters and depths, work sizes. Available in three sizes, No. 15, No. 30 and No. 60.

Tell us about the holes you'd like to produce faster. Large holes or small. If the Rapid Borer can handle the job, you'll produce them faster than ever before. Write for Bulletin LC 501C.

LeBlond customer:

Peter J. Salmon Co., Glenside, Pa. Contract machining, specialists in high precision work. Semi-production machining, drilling, honing.

According to Peter J. Salmon, Owner, "*No machinery investment we've ever made has reduced our immediate costs as dramatically as the LeBlond-Carlstedt Rapid Borer. Actually, it competes cost-wise with any other holemaking method for holes as shallow as one inch. On longer holes there's no comparison! Not with the Rapid Borer, which can feed over 30" per minute!*"

THE R. K. LeBLOND MACHINE TOOL COMPANY

Cincinnati 8, Ohio

LeBLOND of Cincinnati

World's Largest Builder of a Complete Line of Lathes for more than 71 years

Watch Out for British Imports

British Builders Want Bigger Cut of U. S. Market

One toolmaker sees U. S. as his biggest export outlet. He takes a realistic approach.

Price will be an important selling point, but quality will receive equal stress in renewed drive.—By E. J. Egan, Jr.

▪ Britain's machine tool industry seems intent on coming out of its current recession stronger than ever before.

Most British builders, like their American counterparts, are going through a spot of enforced idleness as far as full scale production is concerned. But if the hands are a bit less busy than usual, the brains are certainly working overtime.

Take Heed—Here's the situation. British builders are determined to do more business both at home and abroad when the lull is over. To do it, they're going to fight off competition any way they can. Here are some signs U. S. builders might heed:

(1) The British Machine Tool Trades Assn. recently set up 10 scholarships to enable young men in the industry to study advanced machine tool design at the Manchester College of Technology. This could be a British start toward top-quality, no-axe-to-grind design laboratories similar to those in West Germany and Russia.

(2) The same association is agitating for the Government to drop the import duty on foreign machine tools from 17.5 to 10 pct and, in so doing, cut off all duty-free imports which are now permitted when British buyers claim they can't get certain types of equipment at home.

(3) Some British builders are going to hit the American market harder than ever. One, at least, makes no bones about it.

The company is Alfred Herbert, Ltd., well known lathe builder. Listen to this comment from a recent editorial in the company's magazine: "Although the U. S. is the largest—and in certain directions the leading—producer of machine tools in the world, it is significant that Herbert turret lathes are being sold in increasing numbers and the area bids fair to become our best export market."

Frontal Assault—The sales attack will be vigorous and realistic. Get this, from the same editorial: ". . . performance, quality and finish should [be among] the first 10 points in our schedule of requirements for initial sales. Punctual delivery is not a virtue but an essential. Packaging, presentation and advertising must match the buyer's expectations and poor servicing arrangements will deny the market forever."

Don't go away, there's more to come: "On price alone have we any initial advantage . . . but that lower price must be for an article at least as good, and preferably better, than the comparable American product. It is against the best of their work that we'll be judged."

What Next for Tape Controls?

EXPOSES FILM: Tape controlled machine drills printed circuit boards, also has a light in one turret to expose film used to etch the boards.

INDUSTRIAL BRIEFS

Traveling Trade Show — The U. S. exhibit of small-scale industries in operation will open in Calcutta, India, on Mar. 15. Selected on a basis of requirement and trade development potential, the exhibits include complete shops for sheet metal, machine, shopsmith, and metal spinning.

Business Generals to Meet—Specific measures to resist Russian economic aggression will be discussed by top national business and military leaders at the Fifth National Military-Industrial Conference meeting at the Palmer House, Chicago, Apr. 6-8. Conference headquarters are at 140 S. Dearborn, Chicago 3.

Engineers' Headquarters — The new $10 million headquarters of the nation's leading engineering societies will be erected on the west side of United Nations Plaza between 47th and 48th Sts., New York. Turner Construction Co., New York, is the general contractor for the United Engineering Center.

Harper Expands — During '59, the H. M. Harper Co., Morton Grove, Ill., will spend $¾ million for new equipment and buildings. Facilities in the Metals Mfg. Div. and Bolt Div. will be expanded. In addition, the company is establishing Canadian warehousing facilities.

Packaged Test Equipment — A new company has been formed, Propulsion Test Facilities, Inc., offering "packaged" environmental test facilities for ultra-high-speed aircraft and missiles. It is an affiliate of the MB Mfg. Co., a division of Textron Inc. George Mettler, MB president, will also serve as president of the new company.

Green Light on Research—A. P. Green Fire Brick Co. has expanded its research and testing facilities by installing eight natural gas reheat furnaces and three Leeds & Northrup cam-type program control systems. These furnaces are used for the development of new and improved refractory products.

Still Ticking — Erie Meter Systems, Inc., purchased last November by A. O. Smith Corp., Milwaukee, becomes a part of the new Smith-Erie Div., which includes the A. O. Smith Meters and Service Station Pump divisions in Los Angeles.

West in Stages—Kaiser Aluminum & Chemical Corp., will move its general sales office from Chicago to Oakland, Calif. The move to the Kaiser Center will be accomplished in planned stages, with completion scheduled for about Sept. 1.

Town or Country? — Pittsburgh Screw & Bolt Corp. is planning to ask the stockholders to approve a change of name to Screw & Bolt Corp. of America. It will be voted at the annual meeting on Apr. 15 in the Penn-Sheraton Hotel, Pittsburgh.

Iron Horse Changes Riders—A large coal-fired gas turbine, valued at over $1 million, has been loaned the Bureau of Mines by the Locomotive Development Committee of Bituminous Coal Research, Inc., for studies aimed at broader use of America's coal reserves.

Atlas Subcontracting — The Systems Div., Consolidated Electrodynamics Corp., Pasadena, Calif., has contracts totaling $3.1 million from Convair Astronautics, a division of General Dynamics Corp., for production of ground-support equipment for the Atlas missile program.

Quartermaster Checks Up—United States Testing Co., Inc., Hoboken, N. J., has a $½ million contract with the QM Corps of the U. S. Army to test specifications performance of military suppliers on a variety of products. Contract became effective Jan. 2, '59, and extends for one year.

Anchors Aweigh — The Eastern Malleable Iron Co., Naugatuck, Conn., has bought Danforth Anchors, Berkeley, Calif., manufacturer of boat anchors. Headquarters of Danforth Anchors will be moved to the East Coast and warehouse will be maintained at Berkeley. It marks the first entry of E. M. I. into the maritime field.

Corporate Fusion — Combustion Engineering, Inc. has acquired General Nuclear Engr. Corp., an engineering and consulting firm headed by Dr. Walter H. Zinn. Dr. Zinn has been elected a vice president of Combustion. He will be in charge of the company's nuclear power activities. General Nuclear will be operated as a subsidiary.

Hoist Industry Elects — M. L. Aitken, Robbins & Myers, Inc., Springfield, O., has been elected president, Hoist Manufacturers Assn., Inc. J. S. Jackson, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., elected vice president.

For Balanced Turbines—General Electric Co.'s Medium Steam Turbine, Generator and Gear Dept., Lynn, Mass., plans to build a $600,000 steam turbine balance test facility. It will be capable of testing marine propulsion turbines and land steam turbines for power generation installations at speeds up to 10,000 revolutions per minute.

New Association Director — Joseph A. Anderson, vice president, General Motors, and general manager, AC Spark Plug Div., was elected a director of the newly-formed Automotive Service Industries Assn. The association was formed by a merger of the National Standard Parts Assn. and the Motor & Equipment Wholesalers Assn.

POTENTIAL

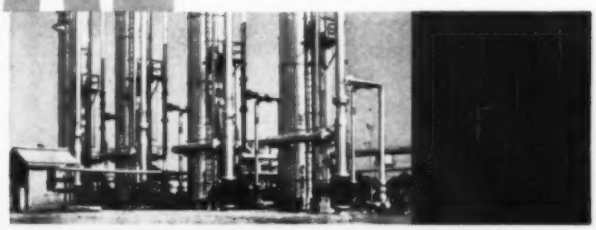
1. FABRICATION of all types of equipment (Fractionating Columns, Gas Columns, Pressure Vessels, Plate and Heavy Steel Work, Special Machines, Autoclaves, Shells, Bridge Girders) is performed to order, to specification.

2. MACHINING—Fully equipped, flexible facilities for machining to close tolerances, regardless of product size or design.

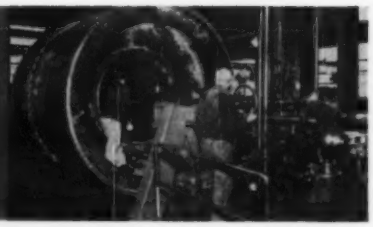
3. STAINLESS—Separate, integrated shop for stainless fabrication protects against contamination by ordinary steel.

4. DELIVERY by rail, truck or inland, coastal or overseas waterway.

1 FABRICATION



2 MACHINING



3 STAINLESS

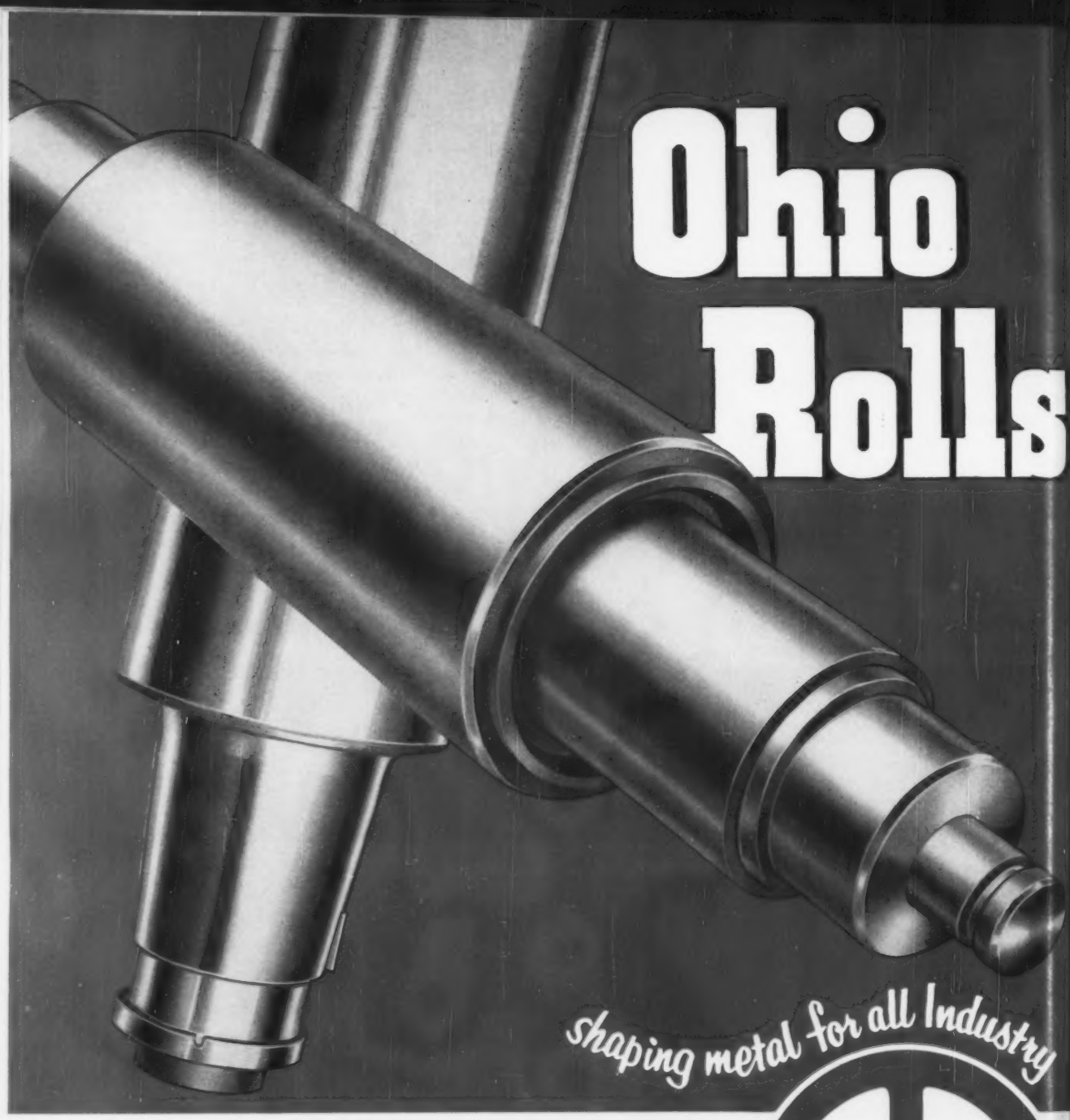
4 DELIVERY

Through integrated, efficient operation, Sun Ship can reduce costs, increase your POTENTIAL. Call for an estimator or representative.

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.



Ohio Rolls

shaping metal for all Industry

OHIO IRON AND STEEL ROLLS

Carbon Steel Rolls
Ohioloy Rolls
Ohioloy "K" Rolls
Nioloy Rolls
Flintuff Rolls
Double-Pour Rolls
Chilled Iron Rolls
Forged Steel Rolls
Denso Iron Rolls
Nickel Grain Rolls
Special Iron Rolls

The Ohio Steel Foundry Co.

LIMA, OHIO

LIMA... Virtually at the center of the steel industry

PLANTS AT LIMA AND SPRINGFIELD, OHIO

S. E. Bergstrom, president, The Cincinnati Milling Machine Co., has been elected president, Cincinnati Milling & Grinding Machines, Inc., the sales subsidiary.

R. C. Hills, elected president, Freeport Nickel Co., New York; **C. J. Brown,** elected vice president, sales.

R. D. Mathias, promoted to vice president, sales, L & J Press Corp., Elkhart, Ind.; **R. H. Kemp,** appointed chief engineer.

R. V. Wallin, appointed vice president, engineering, Union Carbide Chemicals Co., Div. of Union Carbide Corp.

W. A. Woodcock, appointed vice president and general sales manager, chemicals and plastics, Union Carbide International Co., Div. of Union Carbide Corp.

T. G. Barnes, named vice president and general manager, Carbide Div., Firth Sterling Inc.; **R. K. Hopkins,** elected a vice president; **J. S. Roller,** elected vice president, steel sales.

H. L. Bialock, appointed general sales manager, Phoenix Steel Tube Div., Phoenix Steel Corp., subsidiary of Barium Steel Corp.; **A. R. Attebury,** appointed special representative, New York metropolitan area.

Dr. G. H. Wagner, named director, research, Linde Co., Div. of Union Carbide Corp.

R. J. Ogden, appointed manager, screw machine stock sales, Aluminum Co. of America.

W. R. Swick, appointed asst. district manager, New York area, The W. W. Sly Mfg. Co., Cleveland.

H. N. Hartman, promoted to district manager, Chase Brass & Copper Co., subsidiary of Kennecott Copper Corp. at Philadelphia.

T. J. McDonough, Jr., has joined Prentiss Wire Mills, Riverside-Alloy Metal Div., H. K. Porter Co., Inc., as assistant superintendent of the Coarse Wire Dept.

R. C. Bevis, sales manager, elected a vice president and director, Cincinnati Milling & Grinding Machines, Inc.

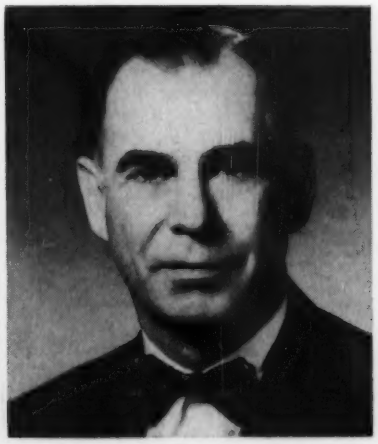
J. M. Perkins, named director, industrial product sales, American Car and Foundry Div., ACF Industries, Inc.

W. H. Hall, named manager, marketing, General Electric's rectifier components product section, Auburn, N. Y., Semiconductor Products Dept.

G. S. Rogers, named asst. director, production planning in charge of methods and procedures, American Steel & Wire Div., U. S. Steel

(Continued on P. 112)

R. H. Carter, elected president, Fostoria Pressed Steel Corp., Fostoria, Ohio.



C. B. Peck, Jr., appointed commercial vice president, Anaconda Wire & Cable Co.

J. L. Tindale, appointed commercial vice president, Anaconda Wire & Cable Co.

★★★★★ ★★★★★

IN EVERY FIELD, THERE IS ONE FOREMOST NAME . . . IN SONIC ENERGY, THAT NAME IS BENDIX

WHAT'S ALL THIS TALK ABOUT SONIC ENERGY CLEANING?

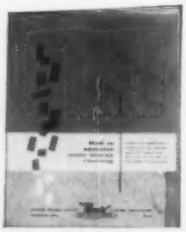
Sonic Energy Cleaning is *a practical production tool* that will reduce rejects on many parts and products, lower cleaning costs and improve product performance.

So there's plenty of good reason for all the talk about Bendix Sonic Energy Cleaning.

Bendix® pioneered and has led in development of Sonic Energy Cleaning for industrial applications and so has more Sonic Energy experience. Our Sonic Energy Applications Laboratory has no equal in its ability to provide the most efficient answer for cleaning applications that can use Sonic Energy to advantage. And our line of Sonic Energy Cleaning systems is most complete.

It makes real sense for any manufacturer to utilize the *Bendix* way of investigating his application and verifying any equipment requirements.

NEW, UP-TO-THE-MINUTE REPORT ON SONIC ENERGY CLEANING



Explains in detail the principles and workings of this process. Illustrates, describes and analyzes typical results. Outlines five-step plan to help you determine feasibility of Sonic Energy Cleaning for you. To get your copy, write: PIONEER-CENTRAL DIVISION, BENDIX AVIATION CORPORATION, 2715 HICKORY GROVE ROAD, DAVENPORT, IOWA.

Bendix AVIATION CORPORATION

SONIC ENERGY CLEANING

(Continued from P. 111)

Corp., Cleveland; **D. J. George,** named administrative assistant in the vice president's office.

G. A. Markell, named product manager, Attachment Div., Clark Equipment Co.'s Industrial Truck Div.

J. H. Reed, named vice president, sales, The Youngstown Foundry & Machine Co., Youngstown, O.

W. E. Niemond, appointed head of Stromberg-Carlson's Tape Center Dept. at the Electronic Control Systems facility in Los Angeles.

John Manning, appointed West Coast sales engineer, rolls, mill machinery and steel plant equipment, Blaw-Knox Co.

J. T. Dilke, appointed sales representative, Leschen Wire Rope Div., H. K. Porter Co., Inc.

E. N. Shutts, elected president, Hartford Steel Ball Co., Inc., West Hartford, Conn.

M. L. Hopkins, named Pacific Coast sales manager, Wheeling Steel Corp.

T. L. Kishbaugh, appointed general manager, Wallingford, Conn. plant, Joseph T. Ryerson & Son, Inc.

Val Heindenreich, appointed office manager, New York district sales office, Allegheny Ludlum Steel Corp., Pittsburgh.

C. C. Libby, appointed manager, Electrical Div., Fairbanks, Morse & Co., Freeport, Ill.

Dr. C. E. Reed, named general manager, Metallurgical Products Dept., General Electric Co., Detroit.

P. D. Moore, appointed manager, General Electric Co.'s Union Relations Service.

L. A. Zwicker, named director, engineering and sales, Harrison

(Continued on P. 117)

BARKSDALE AIR-SEAL* VALVES

LOW PRESSURE AIR TO 250 P.S.I.

. . . over 200 different valves available.

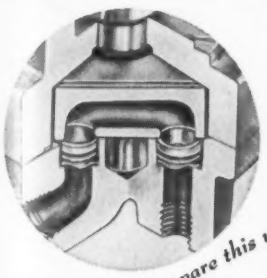
**The air pressure is the sealing force . . . the higher the pressure, the tighter the seal.*

Why so many different air valves?

Because air valve requirements vary with the method of actuation. A basic valve with interchangeable actuators cannot possibly meet ALL your specific applications without compromise. For example: A solenoid valve designed for speed would not have the stamina required of a manual or foot valve.

The Barksdale line of AIR-SEAL Valves has been designed with your requirements in mind. All our valves have been engineered for best performance from your point of view . . . for YOUR specific need, and not to make OUR job easier.

MANUAL and FOOT OPERATED "SHEAR-SEAL" VALVES



No oilers and filters needed — not critical to dirt and corrosion — made from non-corrosive materials.

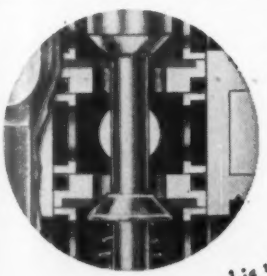
Years of leakproof service — without constant maintenance — Self aligning "Shear-Seal" design compensates for normal wear.

compare this with conventional SPOOL or PLATE VALVES

Alignment is critical — dirt and corrosion cause sticking.

There is no compensation for normal wear — leakage increases with use.

SOLENOID-PILOT CRESCENT® (Self-aligning poppet) VALVES



Quick response (12 milliseconds) due to short travel of poppets and solenoid.

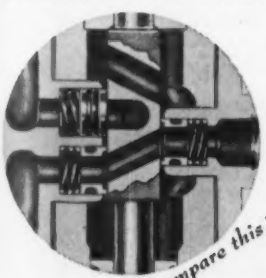
Tight sealing — self-aligning, self-scavenging design adjusts to normal wear — not critical to dirt and corrosion — non-corrosive materials throughout.

No coil burnout — heat dissipating "integral" design.

compare this with conventional SPOOL VALVES

Slower response due to long spool travel. Leakage increases with use — dirt and corrosion particles are ground-in between spool and seals—Sticking! Overheating causes coil burnout — poor heat transfer of "unitized" design.

DIRECT-SOLENOID OPERATED "SHEAR-SEAL" VALVES



Leakproof for years of service — self-adjusting to wear.
No coil burnout — because valve does not freeze up.

compare this with conventional SPOOL VALVES

Dirt enters spool clearances — develops leaks — causes sticking — sticky valves are to blame for most solenoid burnout.

Write for Air Valve Catalog 9-AV

CONTROL VALVE DIVISION

Barksdale valves

5125 ALCOA AVENUE • LOS ANGELES 58 • CALIFORNIA

MANUALLY OPERATED

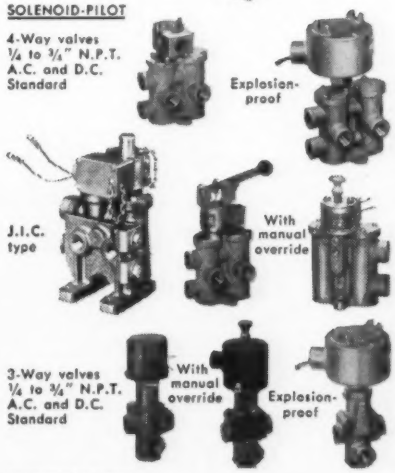
4-Way valves ¼ to 1½" N.P.T. with or without spring return

Shut-off valves ¼ to 1" N.P.T. with or without spring return

FOOT OPERATED

4-Way valves ¼, ⅜ and ½" N.P.T. with or without spring return

SOLENOID-PILOT



4-Way valves ¼ to ¾" N.P.T. A.C. and D.C. Standard

Explosion-proof

J.I.C. type

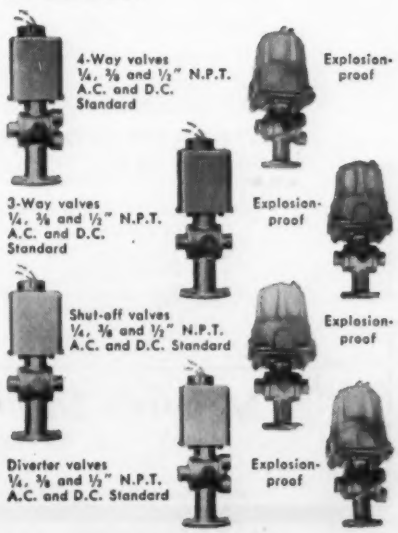
With manual override

3-Way valves ¼ to ¾" N.P.T. A.C. and D.C. Standard

With manual override

Explosion-proof

DIRECT SOLENOID



4-Way valves ¼, ⅜ and ½" N.P.T. A.C. and D.C. Standard

Explosion-proof

3-Way valves ¼, ⅜ and ½" N.P.T. A.C. and D.C. Standard

Explosion-proof

Shut-off valves ¼, ⅜ and ½" N.P.T. A.C. and D.C. Standard

Explosion-proof

Diverter valves ¼, ⅜ and ½" N.P.T. A.C. and D.C. Standard

Explosion-proof

A 3M Case History Report

33% MORE WELD GRINDING PRODUCTION WITH 3M TYPE "C" ABRASIVE DISCS

MANUFACTURER: American Radiator and Standard Sanitary Corporation

ADDRESS: Buffalo, New York

PRODUCT MANUFACTURED: Heating and plumbing components

3M ABRASIVE USED: Type "C" Abrasive Discs

HOW 3M ABRASIVES ARE USED: Removing excess spot-weld metal from cold rolled steel oil burner housings.

OPERATIONAL DATA ON 3M METHOD: Grit 50 Type "C" Discs, on portable grinders, are used to edge-grind spot-welded areas. Customer tested 3M and competitive discs in own shop by painting over backing to prevent identification, and using discs in actual production.

OPERATIONAL DATA ON PREVIOUS METHOD: A competitive brand of abrasive disc was used for the same operation.

PROVEN ADVANTAGES OF 3M METHOD: Operators ground 48 burner units with 3M Type "C" Discs, compared to 36 with competitive disc—got 33% more production out of the Type "C"

WANT MORE INFORMATION? Send for free manual, "Weld Grinding and Blending". Write to 3M Co., St. Paul 6, Minn., Dept. DD-39.

"3M" is a registered trade mark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export: 99 Park Ave., N. Y. Canada: London, Ont.

WE RECOMMEND
How to use coated abrasives to cut costs . . . improve production, shown in the new 426-page book
COATED ABRASIVES
MODERN TOOL OF INDUSTRY
At bookstores or McGraw-Hill, N. Y.

3M Coated Abrasives

TYPE "C" DISCS

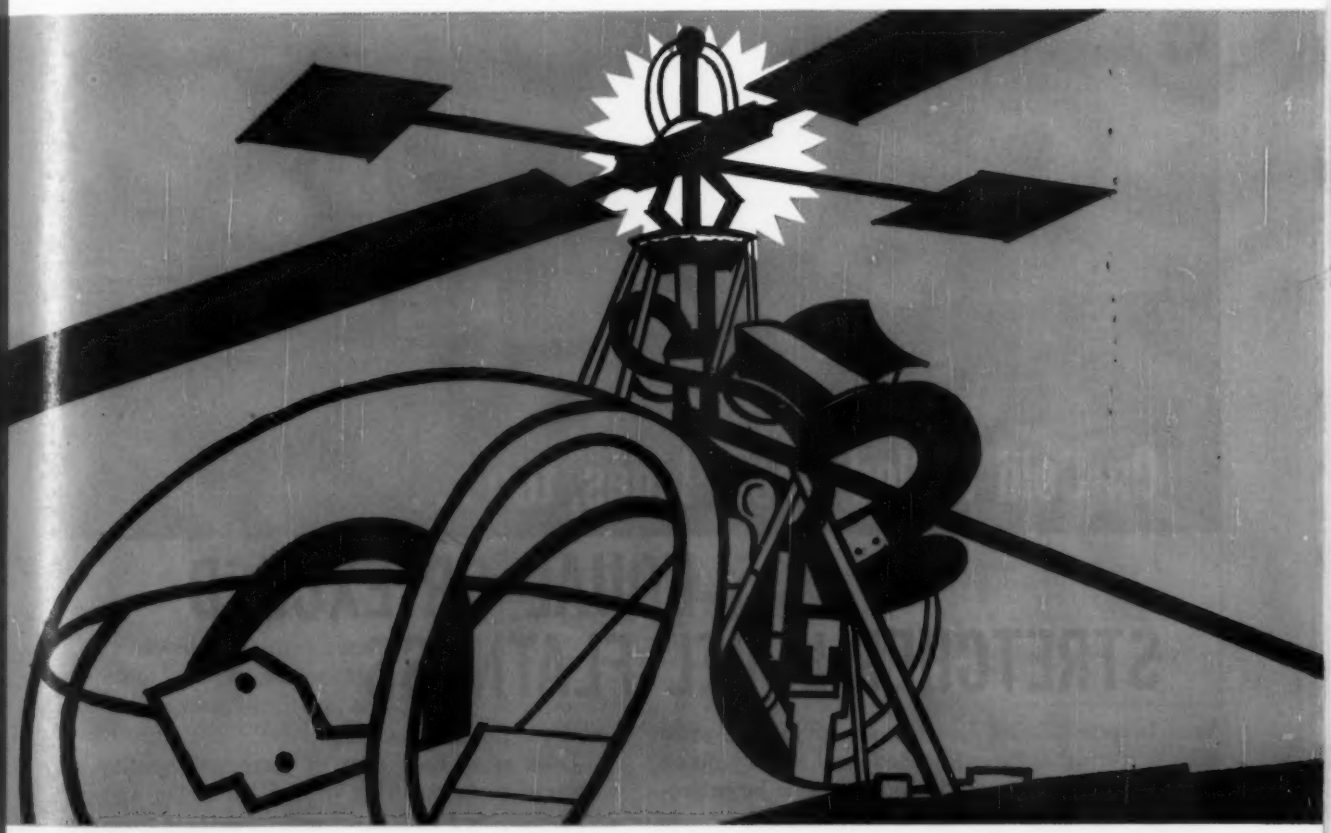
MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

ANOTHER NEW
AIRCRAFT COMPONENT
MADE OF BYERS
AMBALLOY STEEL

AMBALLOY HIKES CAPABILITIES OF VITAL PARTS



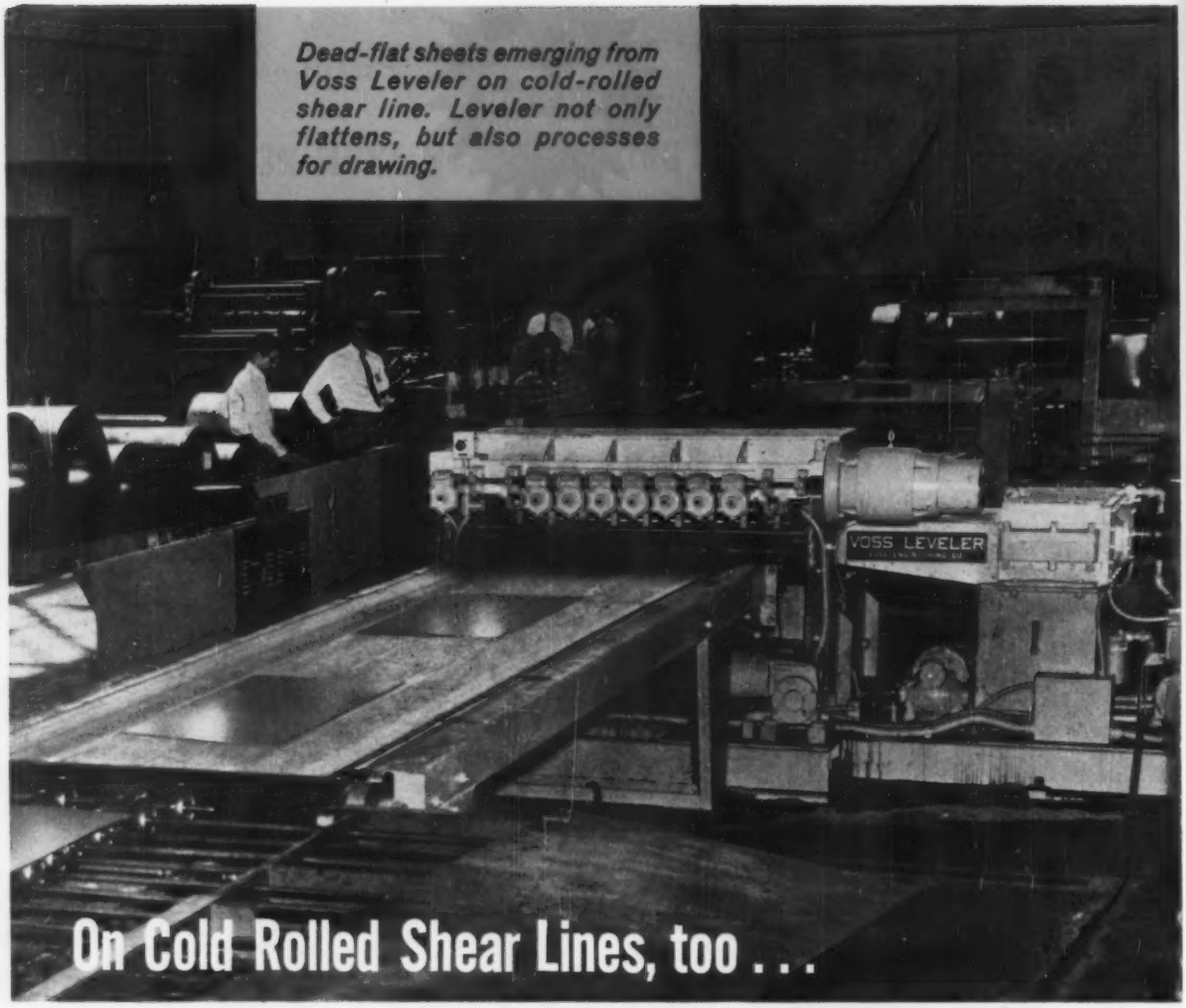
How technically competent is your source of aircraft quality steels? Byers Amballoy steel users are served by trained metallurgists. Amballoy is uniform in workmanship, quality and cleanliness. Amballoy cuts rejections, improves product performance, meets exacting requirements.

Evaluating materials for ultra-critical aircraft and missile applications? Consider Amballoy. Byers high-quality specialty steels boost performance of gear blanks, motor hubs, upset sections, tension rods, screw shafts, steering knuckles, piston assemblies, high stressed latch and catapult hooks, flanges, and gusset plates. Versatile Amballoy is increasing payload factors in scores of longitudinally and transversally loaded parts. For details, write: A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

Mighty mite. This straight bevel gear for power unit of Hiller Helicopter has a workhorse assignment demanding plenty of strength and stamina. Made of AISI-E 9310 Byers Amballoy Steel to Specification AMS 6260E at Vard, Inc., Pasadena.

aircraft quality steels from a technically competent source

A. M. BYERS COMPANY



Dead-flat sheets emerging from Voss Leveler on cold-rolled shear line. Leveler not only flattens, but also processes for drawing.

On Cold-Rolled Shear Lines, too . . .

VOSS LEVELERS EQUAL OR EXCEED STRETCHER-LEVEL FLATNESS

Voss Inverted Roller Levelers are giving the same high performance on cold-rolled steel as they do on galvanized and hot-rolled products. One large producer reports that sheets from 85% of a light-gauge cold-rolled coil are leveled to stretcher-level flatness. Furthermore, this same operator has reduced re-rolling by 25%.

Another example: A maker of wall panels eliminates time-consuming inspection and sorting of individual sheets for flatness. By leveling them with a Voss, he automatically assures panel flat sheets without further checking.

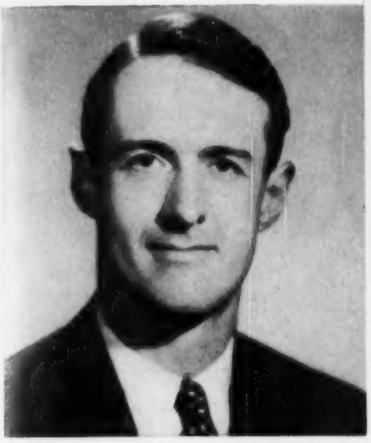
User after user tells of increased quality and lowered costs resulting from Voss Roller Levelers. Voss-patented exclusive design features assure extreme flexibility of application and precise area control on any section of a sheet or coil. Whatever your application—galvanized, hot or cold-rolled, strip, coils, sheets or plate, ferrous or non-ferrous—Voss has a quality-making, profit-making story for you. Write today for detailed information and a list of users.

VOSS ENGINEERING CO.

7301 Penn Ave., Pittsburgh 8, Pa. Churchill 2-4422

(Continued from P. 112)

Radiator Div., General Motors Corp., Lockport, N. Y.; **F. C. Ryan,** named chief engineer; **B. I. Raysor,** named works manager.



R. W. Pressing, appointed general manager, New Products Dept., Linde Co., Div. of Union Carbide Corp., New York.

L. T. Sanders, promoted to market manager, Do-It-Yourself Aluminum and institutional foil markets, Reynolds Metals Co., Richmond, Va.

C. E. Short, becomes Minneapolis district sales manager, Sales Dept., Youngstown Sheet & Tube Co.; **A. S. Harris,** becomes asst. manager, oil country tubular sales, Youngstown, O., headquarters.

T. F. Read, appointed manager, engineering and estimating, Montebello Fabricating Div. plant, Kaiser Steel Corp.

R. A. Obringer, becomes staff assistant to the asst. general sales manager, Product Divisions, Sales Dept. of Crucible Steel Co. of America, Pittsburgh; **J. D. Glenn II,** named staff assistant. Titanium and Vacuum Metals Sales Div.

W. F. Smith, named chief chemist, Aliquippa Works, Jones & Laughlin Steel Corp.; **Milton Moses,** promoted to asst. chief chemist.

J. H. Horn, appointed director, sales, Welded Steel Tubing Div., Southern Fabricating Co., Inc., Sheffield, Ala.

Menasha Container of California

Saves $10,000 yearly with high speed strapping!

FULLY AUTOMATIC strapping of K. D. Cartons is a practical reality. At Menasha Container of California, Division of Menasha Wooden Ware Corporation, for example, an A. J. Gerrard *Automatic Round Steel Strapping Machine* has speeded operations, eliminated bottlenecks . . . is saving the company approximately $10,000 annually in manpower alone.

WORTH INVESTIGATING. Fully automatic equipment could offer you similar savings. Or possibly, by merely utilizing our *newest* strapping *materials* (and your present methods of application) you could cut your strapping costs as much as 50-80%. In any case, we offer you unbiased counsel with no obligation. Use the coupon below or the reader service card for details.

MODEL 3001 & 3002 PRODUCT FEATURES

- Fully automatic.
- Up to 26 ties per minute.
- Package size capacity—Min. 2" H x 8" W. Max. Widest 27½" H x 43" W. Max. Highest 33" H x 34.
- Top and side compression of packages.
- Two machines can be operated in tandem. Dual ties 13½" or more centers.
- Rugged, durable construction for low maintenance.
- Mobile Mounted on casters for easy movement.

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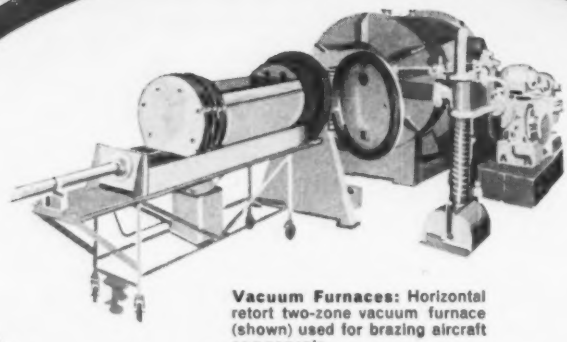
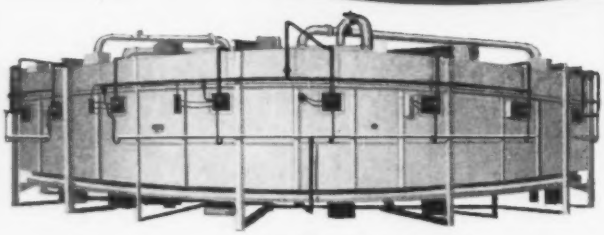
Wherever industry needs heat . . .

There's LINDBERG equipment just right for the specific job



Vacuum Furnaces: Horizontal retort two-zone vacuum furnace (shown) used for brazing aircraft components.

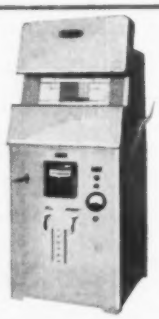
Cyclone Tempering Furnaces: Batch type fuel-fired tempering furnace (shown). Famous in metal treating industry for years.



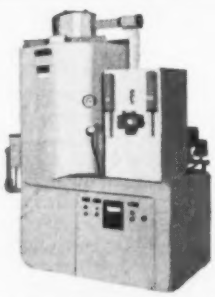
Rotary Hearth Furnaces: Doughnut type field-installed gas-fired furnace (shown) with capacity of 13,000 lbs. per hour.

Ceramic Kilns: Completely automated atmosphere controlled kiln with 8 zones of temperature control (shown). Maximum temperature, 2700°F.

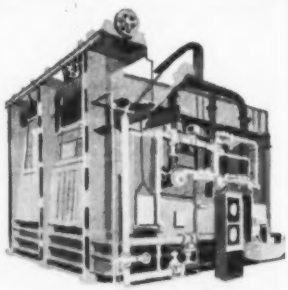
Pilot Plant Equipment: Atmosphere tube unit (shown) for ceramic research and development at temperatures up to 2750° F.



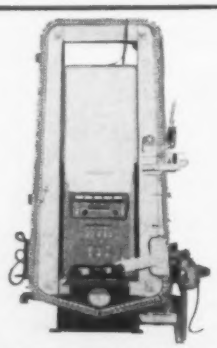
Laboratory Equipment: One-unit box furnace (shown), muffle or for non-oxidizing atmosphere with temperature range to 3000° F.



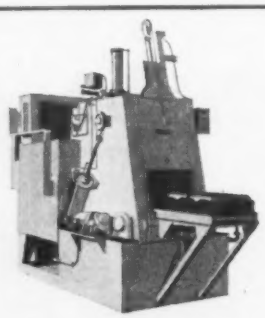
Atmosphere Generators: Hyen generator (shown) for endothermic atmospheres. Generators for all required atmospheres.



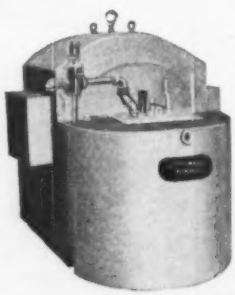
Aluminum Reverberatory Furnaces: Twin-chamber melting and holding furnace (shown) with 45,000 lbs. capacity.



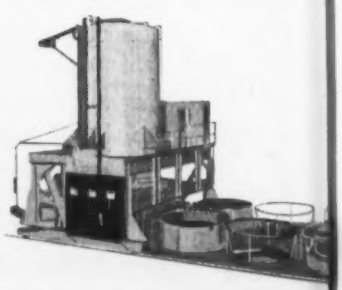
High Frequency Units: Vertically designed, completely automatic "HF" unit (Shown) for aluminizing automotive valves.



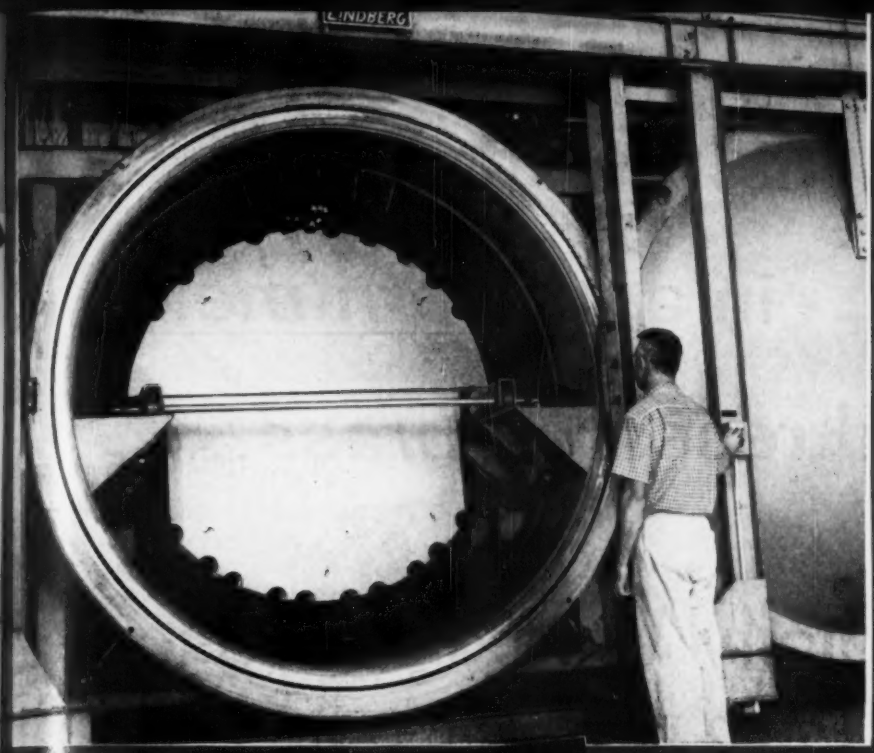
Automatic Carbonitriding Furnaces: Automated integral quench type (shown) with CORRTHERM electric elements.



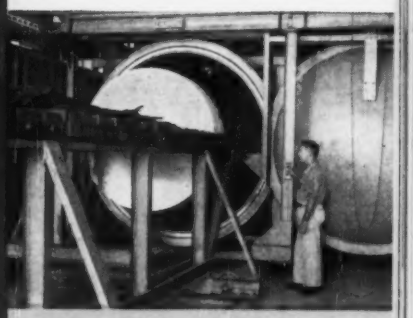
Melting and Holding Furnaces: Electric resistance furnace (shown) with capacities of 750 lbs. to 1500 lbs.



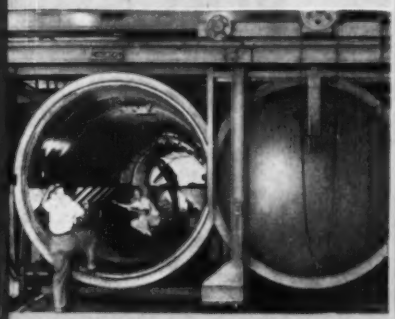
Gantry Type Furnace: Vertical, controlled-atmosphere, drop bottom, hardening furnace. Complete installation field-installed by Lindberg.



Lindberg-Designed



6 feet in diameter, the furnace easily takes large titanium sheets.



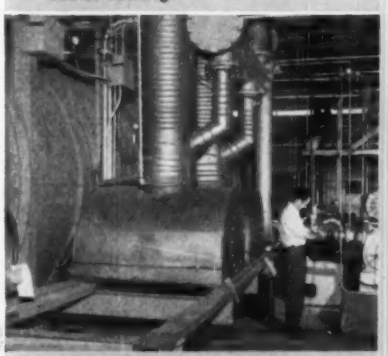
Total furnace length is more than 40 feet.

Large Capacity Vacuum Heat Treating Furnace Improves Titanium Quality, Saves Money in Aircraft Manufacture

Here is an outstanding example of Lindberg's ability to apply a basic furnace design to the requirements of a specific job. This vacuum furnace was designed for a leading aircraft manufacturer to heat treat large sheets of titanium. In operation it reduces the hydrogen content of the metal from 500 parts per million to 50 parts per million or less, in a maximum time of 6 hours. And this improvement in quality is achieved with a corresponding reduction in production costs. The furnace has a temperature range up to 2100° F. and operates in a vacuum of less than one millionth of an atmosphere. A unique internal cooling system makes the furnace adaptable for brazing stainless steel honeycombs, a new development in aircraft manufacture.

Lindberg equipment and planning can help you find the answer to any problem of applying heat to industry. We cover the field, heat treating, melting and holding, tempering, brazing, enameling furnaces, ceramic kilns, high frequency units, and are in the ideal position to recommend the equipment most suitable for your needs. This can be factory built or field-installed in your own plant, fuel-fired or electric. Consult your local Lindberg Field Representative (see the classified phone book) or get in touch with us direct. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California.

After vacuum cycle, inert gas is introduced into chamber to assist cooling.



Specially designed pump maintains vacuum of less than one-millionth of an atmosphere.

LOOK UP LINDBERG . . . BOOTH 660—WESTERN METAL CONGRESS

LINDBERG heat for industry

If you're interested

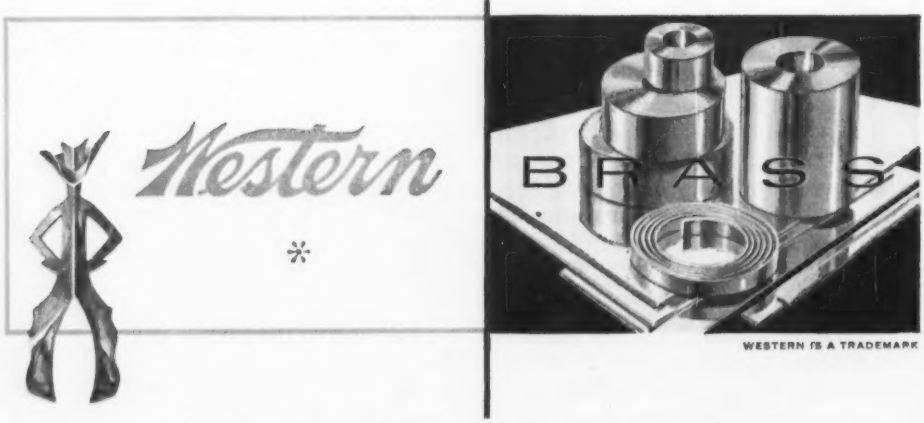
in a *modern metal*

you should research *brass*...

especially Western Brass...

it's "*tailor-made*"

for each job!



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How to Get More From Your Data Processing System

By E. W. Mitchell—Controller, Norma-Hoffmann Bearings Corp., Stamford, Conn.

A data processing system will do as little or as much as you decide. Why limit it to bookkeeping chores when it can steer your business to greater efficiency and bigger profits?

▪ Using a data processing system simply to mechanize laborious clerical jobs in payroll calculation, inventory control, billing and the like doesn't make much sense.

It's true that mechanical data processing almost always speeds such work, improves accuracy and cuts costs. But its real value lies in its ability to give management closer control over the whole range of sales and manufacturing operations.

A good comprehensive system tells management exactly where the company stands from day to day. It provides the information needed to decide what should be done the next day, week and month.

Data collected in a comprehensive system can be processed to serve hundreds of uses. For example:

It can tell management what the factory backlog is, what production costs are, what shipments have been made, what the trends are in orders received, what the actual profit is on each product and order.

It can tell the production department when to manufacture to meet delivery dates. It can pinpoint jobs that fall behind schedule. It can tell what volume is scheduled for any day, period or operation far enough ahead to adjust working schedules, hire new workers, or transfer others.

It can tell the quality control staff how much material is being scrapped or reworked. The manager

What Data Processing Does for Norma-Hoffmann

The company set up a punched card data processing system in 1957. It uses IBM key punch machines, typewriters, sorters, collators, printing machines and a calculator. Rental cost of all equipment is $2200 per month.

Here are the key areas where the system pays off:

Production Scheduling—Delayed shipments virtually eliminated. Manufacturing cycle cut by 15 days. Plant can handle special and rush orders without any trouble.

Quality Control—The manager gets full and prompt information on all scrap or rework material, can trace the operation, machine, or operator responsible.

Cost Accounting — Regular reports cover labor variance, cost of sales, labor distribution, cost analyses of parts in process. Periodic reports cover such comparisons as actual vs. standard costs.

Order Processing — Punched cards are prepared for every order. They assign work to specific machines and operators, also serve to report daily progress on all jobs to the data processing center. Integrated data flowing from the center keeps management informed.

Payroll Accounting — The same punched cards that follow each job, plus time cards, are used to prepare the 800-employee payroll.

Clerical Costs—Thus far, overall savings in this area are calculated at $30,000 annually.

DAILY PRODUCTION: Mr. Mitchell (l.) checks report with production manager Charles Alexander.

NO COMPUTER: By setting up circuit boards, data processing equipment can be made to serve hundreds of uses in management control.

TROUBLE SHOOTER: Inspection results and reasons for any rejects are coded on punched cards to aid quality control operations.

can get a breakdown of rejects by cause, type and size of product, operation and operators.

It can tell the industrial engineering group the specific operations that are out of line on costs.

It can tell the purchasing department what materials are on hand and what will be needed.

It can tell sales management what customers, industries and areas are buying and which salesmen are selling best.

So, in the light of all the decision-guiding facts that data processing can provide, it's almost incidental that it can also do all the payroll work, including check writing.

A good, comprehensive data processing system doesn't require more paperwork. It actually simplifies record keeping throughout the company. Almost all management control data is already recorded in some form by most companies. Data processing just assembles it in a more useful form for making decisions.

About the Cost — Expensive equipment isn't necessary for a comprehensive data processing system. And since the information needed for most business decisions involves plain arithmetic, you don't always need a computer. Relatively simple punch card equipment that will sort, collate, summarize and print data can handle the whole range of business control problems.

Most companies whose annual sales range from $5 to $20 million can rent all the equipment they need for $1000 to $3000 per month. And almost every company in this size range can benefit from the closer control data processing provides. For larger businesses, the advantages are more obvious.

Where to Start—Every company that considers putting in a comprehensive data processing system wants to use it in solving some one major control problem. It is a mis-

BIG HELP: Data processing system helps sales v.p. R. L. Miller make a variety of analyses and forecasts.

take, however, to think of data processing in this limited sense.

In operation, there is little more work in a system that covers all control areas, than there is in one that's restricted to a single area. Making a system as comprehensive as possible is the only way to insure full value.

It is possible to install a system in steps, but the full range of control possibilities should be considered at the start. Payroll computation, for example, may be deferred even though it probably pays for itself (in reduced clerical costs) quicker than any other operation. Still, it can be given a low priority because it contributes nothing to managerial control.

Who's Responsible?—A program that covers the entire range of manufacturing and sales controls obviously can't be established by one department. Top management must give its enthusiastic support and clearly define authority and responsibility for the program. Full responsibility should go to one person, preferably a man who knows manufacturing operations.

Most of the more than 30,000 data processing systems now in use are set up in accounting departments. This is because they're most often used for paperwork in the narrowest sense. A full-value data processing department should be a separate function, serving all departments in the company, including accounting.

Whether the personnel who run the data processing project are drawn from accounting, production planning or elsewhere isn't important.

All Must Help—Getting a system off the ground takes cooperation all around. Validity of the results obtained depends on meticulous, systematic data reporting. All departments must be educated in how the system works; an understanding of the purpose of the data reported reduces chances for errors.

In changing from long established methods to data processing, the advantages the new system will bring to the company and to each department must be emphasized.

Few Technical Problems — The technical problems in installing a data processing system are not great. It takes time to select and install equipment and to train personnel, but equipment makers are quite helpful in these respects. Insofar as they will not limit operation of the system, the mechanics of data processing should follow existing procedures.

The data processing system at Norma - Hoffmann Bearings Corp. has actually made it easier for all departments to report the same information formerly reported on a wider variety of more complex forms. Management now believes it has progressed to the point where a computer will be useful and one is now on order.

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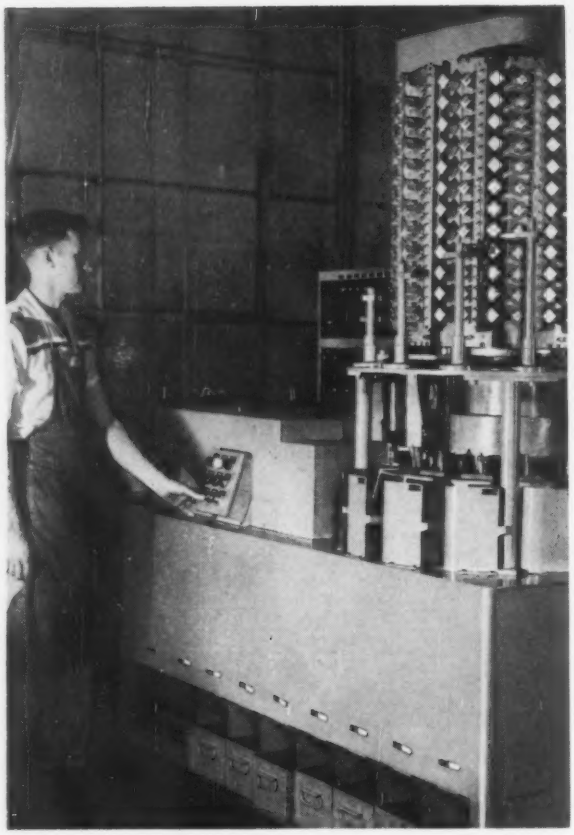


ROLLER INSPECTION: Tower above machine houses memory unit. Below are bins for sorted sizes.

IN THE POCKET: Operator's hand marks chute which discharges gaged parts to proper turret pockets.

Electronic Gages Sort Small Parts for Better Fits

Do you have to pair up large numbers of small parts for precise fits? Electronic gages and sorters are made to order for such jobs.

▪ Many of today's products demand such precise fits in mating parts that it's almost impossible to match them by random choice. Given enough time you can probably get perfect fits by trial and error. But this is like looking for two needles in two haystacks over and over again.

Aetna Ball & Roller Bearing Co. found a faster, more reliable way recently. About six months ago the company installed electronic gaging and sorting equipment in its roller bearing assembly department. Since then, production capacity has increased by as much as 400 pct.

Gages All Sizes—The equipment is designed for long production runs, of course. But since Aetna makes a lot of different bearing sizes the inspection setup also has to be versatile. It is. Complete changeover time in going from one size to another averages about two hours. Even switching the setup from the smallest to the biggest roller size takes only five hours.

One machine checks roller length and OD with electronic gage heads that relay this information to memory centers. These are located in a machine turret that rotates at preset speeds.

After each part is gaged it drops into a certain one of a number of pockets in the turret. In turn, each pocket has a particular discharge point. When it reaches this point the memory device triggers a drop

gate in the pocket and the roller moves down a series of inclined planes into a tote box.

Careful Sorting — Thus rollers are sorted into nine OK categories in increments of 0.0001 in. They're also classified as "OD Over," "OD Under," "Length Over," and "Length Under."

Meanwhile, an operator assembles inner and outer races and places them on an inclined feeder leading to another electronic inspection unit. This machine checks outer races for width and OD and rejects those that are out of tolerance.

Pairs of races that pass this check point are hand fed to a fixture which inserts the bearing rollers. Semi-assembled bearings then go to a third inspection machine which checks them for radial clearance and rejects any which are defective. Snap rings are then attached to complete the bearing assembly.

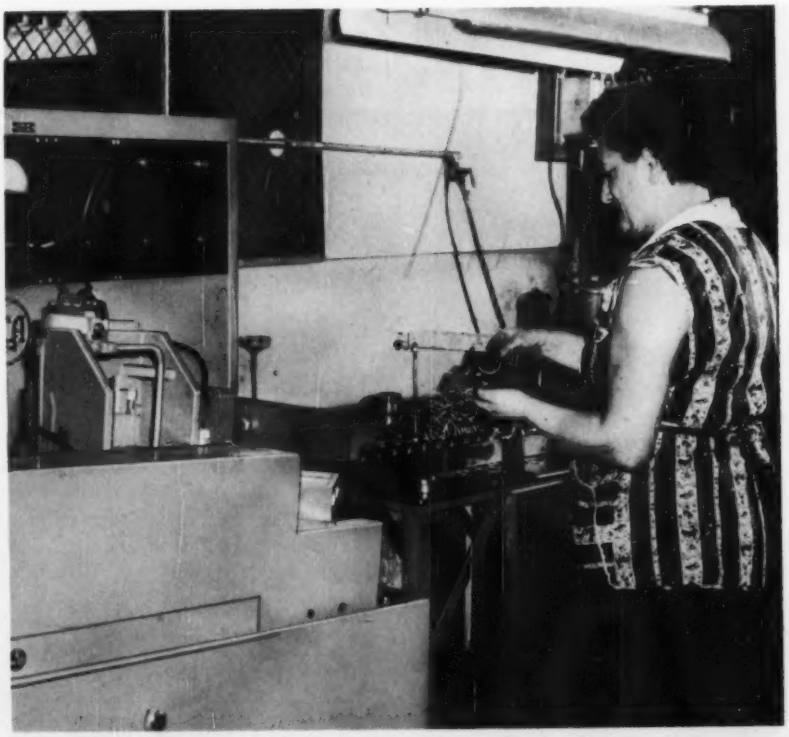
Simple and Reliable — Aetna's gaging equipment was developed by the Industrial Automation Equipment section, Radio Corporation of America. The electronic system is both simple and reliable. It uses no signal amplifiers, nor is it affected by external magnetic fields or magnetic workpieces.

Key to the electronic gaging system of the high-speed units is a high-frequency oscillator. It supplies a signal to the gage head through a coaxial transmission line.

All electronic components are standard modules, interchangeable with similar units in other RCA equipment. Thus they can still be used even if the original equipment they were part of is modified for some other use.

The versatility of the electronic system is demonstrated by the wide range of uses it has already been put to, including self-compensating grinder controls, piston and piston pin checking machines, valve checking equipment, spring testing, automatic high speed hardness testing, and many others.

ANOTHER CHECK: Operator pairs inner and outer races and loads them onto feed track of machine which checks outer race width and OD.



LAST IN LINE: Electronic unit checks for radial clearance and segregates those bearings which are over or under specified tolerances.

New Units Boost Capacity For Forming Heavy Plate

When you can form parts of greater size, assemblies can be in larger sections.

It permits make-up of pressure vessels with less welding and inspection of seams.

▪ To meet the increasing need for pressure or process vessels and nuclear reactors, the Process Weldment Div., Struthers Wells Corp., Titusville, Pa., has installed special equipment: a 2500-ton flanging press, extra-large capacity plate-bending rolls, and a furnace to handle the huge steel plates.

With this tooling, assemblies can be in larger sections. It reduces the plate preparation, fit-up, welding and X-ray inspection for additional seams needed for smaller sections. The new setup rolls and forms plate up to 4 in. thick by 12½ ft wide.

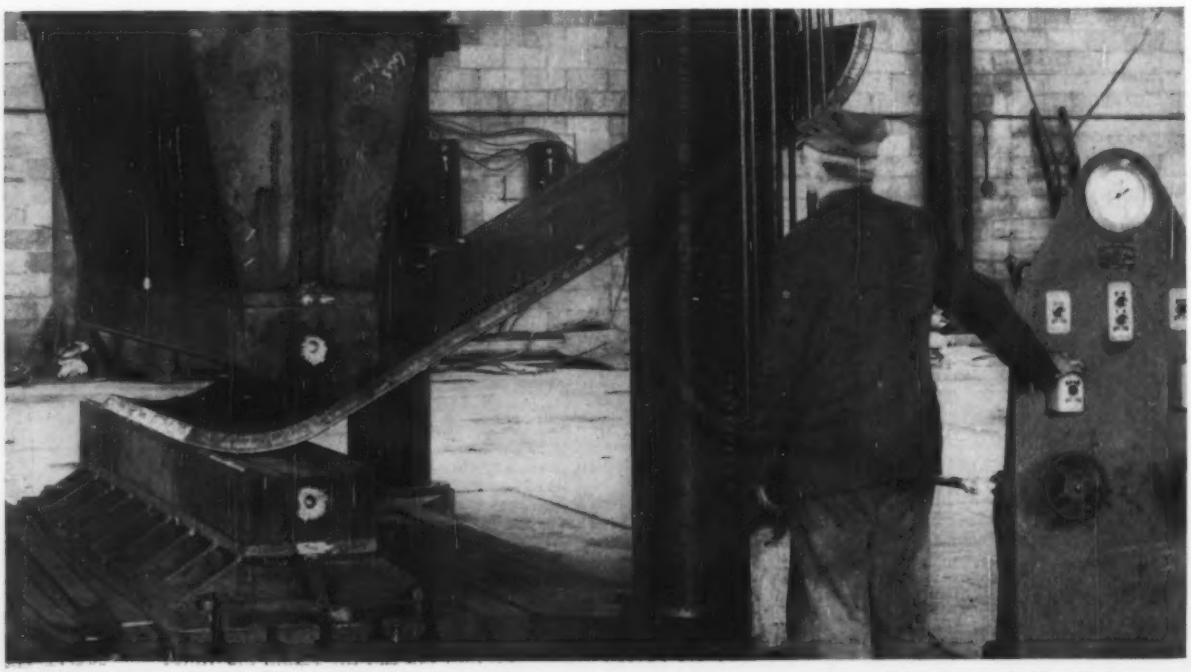
For Thick-Walled Parts — With the use of special beam-type bending dies, the press can produce small thick-walled cylinders 20 ft long in halves or semi-circles. The open-end press-brake type dies permit even longer cylinders to be formed.

The building in which the setup is located has a 60-ft span and is 486 ft long with 25-ton overhead electric traveling crane 35 ft above the floor. The furnace, erected in an adjoining lean-to between the press and rolls, provides a clear operating area for the major units. This central location of the furnace allows rapid and unobstructed handling of hot material to either the press or the bending rolls.

Multi-Purpose Unit—Performing many versatile operations, the 2500-ton flanging press, built by R. D. Wood Co., Philadelphia, may be used to crimp or break plate edges prior to rolling, form semi-circular cylinders, hot or cold, and form to close tolerances all the common types of flanged vessel heads to 10-ft diam. It will corrugate Morison furnace shells, straighten weldments, swage pipe, and deep draw.

A self-contained oil hydraulic unit, the press has a platen area of 7 x 12 ft between columns and maximum daylight of 8 ft 4 in. between the top and bottom platens. Sensitive controls actuate the press on cycle or jog.

It's an up-moving type with 4-ft stroke. Any combination of the three 29-in. main cylinders and two jack rams will move the bottom platen. At any stage of the stroke the separate ejector ram may be actuated.

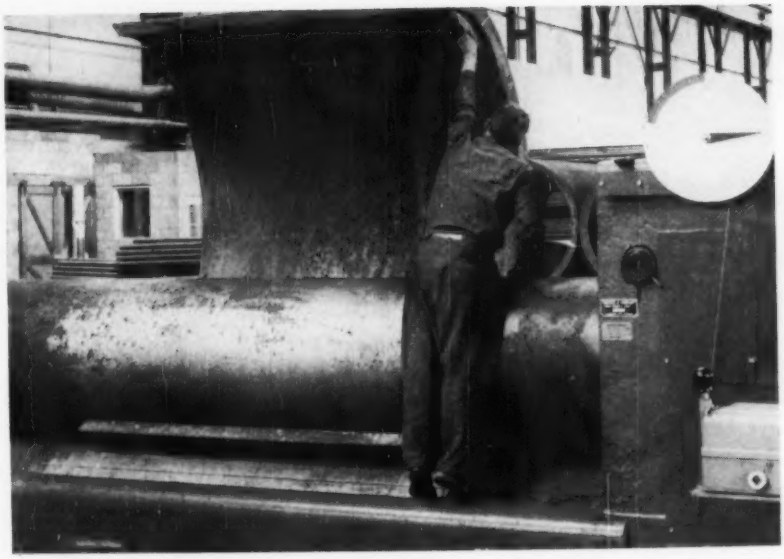


FLANGING EASE: Hydraulic 2500-ton press bends heavy plate to close tolerances. Platen area is 7 x 12 ft.

Hydraulic Powered—An Oilgear 125-hp pump mounted on top of the press furnishes hydraulic power. The hydraulic system pressure is 2250 psi with a 1200-gal oil reservoir.

The press operates either at 2500 tons or at 1000 tons for higher speed. Approach speed is 110 ipm per minute, and pressing speed is 28 ipm at 2500 tons.

Total weight of the press exceeds 240 tons with the moving platen alone weighing 83,100 lb. The foundation, which is slightly over 20 ft below floor level, required 220 cu yd of concrete. In meeting adverse subsurface water and soil conditions, it was poured without interruption to avoid stoppage and consequent water seepage into the pit.



ROLLING TO SHAPE: Operator checks curvature. Three 30-in. diam rolls progressively form plate to shape. Roll working height is 20 in.

Use Huge Rolls — The plate-bending roll unit, built by Bertsch & Co., Cambridge City, Ind., is an initial pinch type. It has three 30-in. diam forged steel rolls with 12 ft 8 in. working tread.

This machine progressively deforms a hot or cold plate section to shape it into a cylinder or cone. The top and bottom front rolls are set apart an amount equal to plate thickness.

The rear bottom roll, which is power adjusted up or down, applies the load against the plate to deflect the material in the direction of curvature, while the two front rolls pull the plate through. All three rolls are geared to operate at the same linear feeding speed.

Roll Capacity—Nominal capacity is 2½-in., 84,000-psi-tensile steel plate 12½ ft wide. Steel plate 4 in. thick of the same dimensions can be rolled hot.

The main driving elements of the machine are set in a large concrete foundation—pitted to give a 20-in. roll working-height above the floor. The main drive consists of a 150-hp motor which drives the top and bottom rolls and 75-hp motor to raise or lower the rear roll.

Dual push-button controls and five point lever type master switches are mounted fore and aft of the machine to permit operation from either the front or rear. A single shot pressurized lubricating system is installed on the machine to grease all main bearings.

Easy Work Removal—To remove finished work from the machine, the operator steps on a foot-actuated air treadle valve. An air cylinder swings down the right hand end casting. At the same time the top roll tilts upward to release the pinch on the work.

After removal of the rolled shell by an overhead crane the operation is reversed to return all rolls and gears to their original position ready to form a duplicate cylinder. The large graduated dial indicator guides the operator in pre-positioning the bottom rear roll for duplicating any shell course.

Built For Service—Built by the Plant Engineering Department of Struthers Wells, the car-type plate heating furnace serves both the flanging press and bending rolls. Its nominal size is 8½ ft high, 13 ft wide and 28 ft deep.

Designed for operating at temperatures to 2250°F, it's fired by combination oil and gas burners. Indicating and recording instruments control the furnace for uniform and scale-free heating of material.

In addition, at the door end, a special group of burners, combined with a portable baffle set on the car deck, permits fast over and under heating of a plate edge for crimping prior to rolling. Thus the unit is suitable for plate-edge heating, stress relieving, normalizing or forge heating.

Close Control—In one case, accuracy of heating permitted control of furnace temperature to a critical 750°F for heating hundreds of large 1 1/16-in. thick aluminum plate blanks for flanging into aluminum tankcar heads.

Self-propelled by a motor and speed-reduction unit mounted on the front end, the furnace-car truck runs at 40 fpm. The drive unit transmits power to three pairs of drive wheels through multiple-strand roller chains and sprockets.

The drive setup eliminates car winches or pulling attachments with chains stretched across the main floor which would obstruct working area between the rolls and press. The furnace car has a 12-ft wide plastic refractory deck. Heat-resisting cast iron sand-seals retain heat in the furnace chamber.

COILS AND SHEETS: Vinyl-coated steel is produced in a wide range of gages, widths, colors, and patterns.

Vinyl-Coated Steel Sheets: Color, Pattern, Protection

Steel sheet is highly decorative, as well as functional, when it is coated with colored vinyl plastisols.

A natural for consumer lines, here is a new mill product that's likely to find many industrial applications as well.

▪ Steel sheets dressed on one side with a colorful, laminated vinyl-coating have been adding to the "eye appeal" of many consumer products. Introduced just a few years ago, they consist of a layer of semi-rigid vinyl sheeting bonded to conventional steel sheet.

Now something new has been added. In place of vinyl sheeting, U. S. Steel Corp. is roller coating a liquid vinyl on carbon steel sheet. The new product claims excellent adhesion, especially after severe deformation. It will be turned out on a "mill product" scale.

Good Bond—The bond between vinyl coating and steel sheet is unusually strong and accounts for much of the material's versatility. It can withstand a pulling force of 22 psi without parting. It can match this adhesion standard after 30 pct elongation, immersion in boiling water for 5 minutes or 80°F tap water for 240 hours, exposure in a dry oven at 200°F for 7 days or in an atmosphere of 100 pct relative humidity at 100°F for 200 hours.

The U. S. Steel process involves curing and bonding of liquid vinyl plastisols to sheets and coils (either cold-rolled or galvanized) in a continuous coating process. Before cooling, the coating can be embossed with any texture that can be engraved on a printing roll. The vinyl coat is available in an almost endless variety of colors.

Cinch to Clean — Vinyl-coated sheets can be easily cleaned with many conventional cleaning agents. They may be wiped or washed with soaps, detergents, household ammonia, or mineral spirits. Alcohols and some ethylenes may be used to

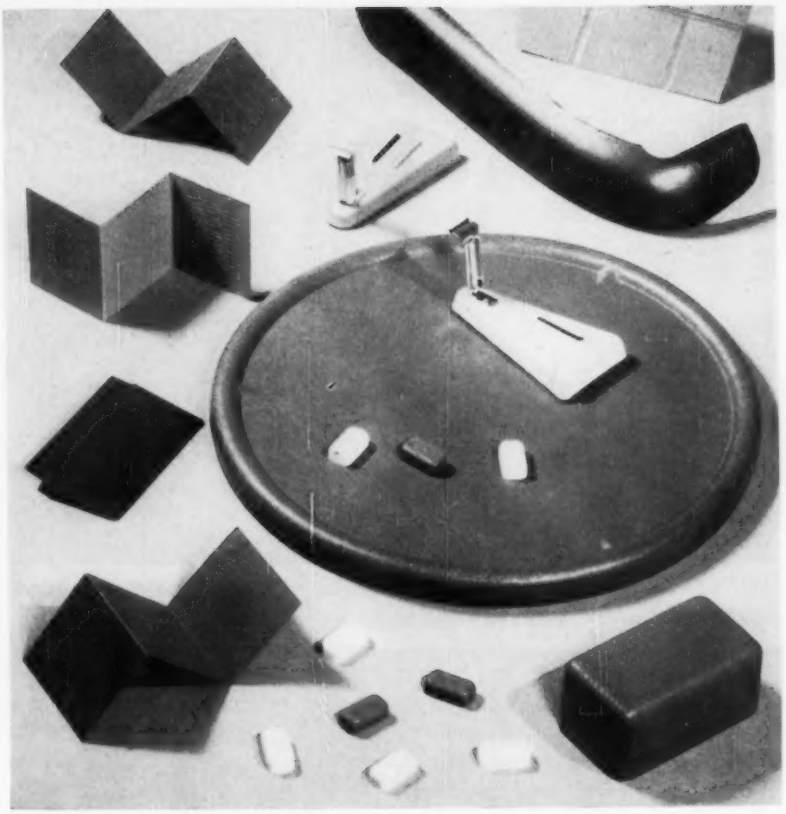
remove stubborn stains. Obviously, those solvents that attack or dissolve vinyl (such as benzene and carbon tetrachloride) must be avoided.

The new sheets are available in varying gages of vinyl. The hardness of the vinyl coating may also be varied. This provides added flexibility in better resisting abrasion and scuffing. Once matched to a particular color, the same color of vinyl can be maintained from run to run on a tonnage basis.

Fabricating Pointers — When it comes to fabrication, vinyl-coated steel may be formed, punched, slit, lock seamed, deep drawn — even welded. Drawing quality, special killed vinyl-coated sheet will readily withstand elongations up to 30 pct.

Proper die settings and clean dies are most important to successful die forming. Small bits of metal or paint left in dies from previous operations will scuff vinyl surfaces under severe die pressures. Die clearances should be set for the ordered thickness of the steel plus 60 pct of the specified vinyl coating thickness.

In deep-drawing, it is essential that dies and auxiliary equipment coming in contact with the vinyl be free of sharp edges. In other respects, vinyl-coated sheet responds similarly to plain carbon sheet in deep drawing. Water-soluble lubricants should be used for both drawing and stamping operations. These can be washed away with warm water and do not require vapor degreasing which damages vinyl.



VARIED SHAPES: Coated sheet can withstand elongation of at least 30 pct without damage. It can be readily formed, punched, slit, welded.

Can Be Welded—As for welding, vinyl-coated steel can be welded (without damaging the vinyl) on

Helpful Pointers For Projection Welding

(Uncoated Sheet Steel to Back Side of Vinyl-Coated Sheet)

Material Joined		Welding Conditions*					Results of Tension Tests		
Vinyl-Coated Steel									
Type Coating and Steel Thickness, in.	Uncoated Steel Thickness, in.	Projection Size Dia., in.	Projection Size Height, in.	Electrode Force Contact with Coated, Uncoated, Sheet, lb*	Welding Time, cycles	Welding Current, amp	1. Tension Shear Strength, lb†	2. Tension Pullout Strength, lb†	Weld Dia., in.†
Hair Cell, (0.027)	0.019	0.06	0.018	60	¼	51,800	310	142	0.07
Buffalo Hide, (0.035)	0.040	0.12	0.030	60	½	43,200	220	198	0.08
Buffalo Hide, (0.050)	0.040	0.12	0.030	60	1	59,500	348	295	0.10
Buffalo Hide, (0.062)	0.040	0.12	0.030	90	1	68,000	503	388	0.10
Buffalo Hide, (0.062)	0.061	0.18	0.041	120	1	87,600	830	563	0.12

NOTES: + Indirect projection welding with electrodes 1-½ in. apart (center-to-center).
* Electrode-tip diameter, 0.30 in.
** Electrode-tip diameter, 0.25 in.; electrode force reported is value after collapse of projection.
† Average of three tests.
Appearance of vinyl coating unharmed in all cases.
1. Tension shear strength refers to the number of pounds of pulling force parallel to the surface of the two welded steel sheet samples at which the weld failed. You will note from the above that this figure is the average of three tests.
2. Tension pullout strength refers to the number of pounds of pulling force normal to the surface of the welded steel sheet samples at which the weld failed.

TOUGH SURFACE: Scratch tests prove that vinyl-coated steel wins hands down over painted steel and linoleum. Vinyl hardness is controllable.

conventional welding machines so long as they have been properly modified. For example, a single phase, A-C welding unit equipped for indirect projection welding can be used to weld uncoated steel sheets to the uncoated side of vinyl-coated steel sheets. The important provision is that the equipment have standard electronic controls modified for "half-cycle welding."

Modified electronic controls permit the passage of only ½-cycle of alternating current. This is in contrast with standard controls which have a minimum timing limit in the range of 1 to 3 full cycles. According to U. S. Steel engineers, use of modified welding equipment "extends the possible applications of vinyl-coated sheets beyond that made possible by previously feasible means."

How It's Done—Some typical projecting welding conditions are shown in an accompanying table. These are optimum only for the particular size of projection used. They are not necessarily the welding conditions (including projection sizes) which give welds of optimum strength and no damage to the vinyl coating.

The projection sizes listed are about the same as those used in the automotive industry when uncoated steels are projection welded. Optimum sizes for projection welding vinyl-coated steel are still being checked. It is possible that much larger projections can be used with the new sheet. These welds would have even higher strength values.

Tension - test strength values shown in this same table are much lower than those obtainable with projection or spot welds joining uncoated steel sheets. However, a cluster of welds can be used to raise strength values for vinyl-coated steel.

Can Be Leveled—What flatness tolerances are applicable to the new sheets? Normally, the material is furnished to a commercial level of flatness within standard AISI tolerances. They can be furnished to stretcher level standards of flatness. Or they may be stretcher leveled or roller leveled at the customer's plant with no damage to the vinyl coating.

A basic problem in fabricating finished products from vinyl-coated sheet is the protection of the reverse side. In some cases, the most economical approach is to paint the uncoated side after fabrication. Where this is undesirable, the reverse side of the sheet can be coated at the steel mill for an extra charge.

On The Back — Two coatings have proven satisfactory in field tests. One possible coating is a color-pigmented, modified epoxy. It has good rust resistance and offers a permanent type protection. Both weldable and formable, it is available in an aluminum pigment and several other colors. Unlike the phosphate coating, it provides a good paint bond.

A pigmented epoxy phenolic coating can also be used. It resists rust and is a permanent type coating. Available in a number of colors, it can be drawn and formed. Its welding characteristics are fairly good. Paint will bond to it well.

Edge protection is a matter of importance to the designer using vinyl-coated steel sheet. In some cases, the edge can be turned under. In others, it can be left as-is. Where an edge-coating problem arises, air-drying vinyls of matching color can be used to provide a neat, finished edge. Also, both the edge and the backs of these sheets can be zinc or cadmium plated with no detrimental effect to the vinyl.

Other Finish — Galvanized steel sheets may be coated with vinyl. Adhesion of the vinyl to this surface is generally good. The finished sheets can withstand a medium draw without damage. Some edge protection is gained from the sacrificial action of the zinc coating.

As for the thickness of the vinyl coat, this can range from 0.008 to 0.020 in. It can be specified in increments of 0.001 in. within this range. Coating hardness ranges from about 60 to 90 Shore A Durometer. Steel sheets are available in gages from 18 through 28. Widths range from 24 to 52 in., lengths from 30 to 144 in.

The material is also available in coils.

Low-Cost Solder Joins Al to Cu

It's better to use a lead-free solder in joining aluminum to copper.

A tin-zinc solder is the low-cost answer for one job and it applies wherever the two metals are joined.

▪ Copper tubing on aluminum plate forms solar heat-collecting panels for an office-building heating setup. Their construction posed the problem of how to solder copper to aluminum.

The structure, the Bridgers & Paxton office building, is located in Albuquerque, N. M.

While there are several suitable solders, one turns out to be lowest in cost: tin-zinc. It satisfies the requirements for resistance to corrosion and galvanic action.

Further, it will not discolor with time and retains its bright finish. It's good for 8000 psi tensile.

The companion flux for the tin-zinc solder is a salt type in paste form. It's applied cold to areas where solder is to be applied.

When heat is at correct level, flux boils, then gives off white smoke and is rendered inactive. Capillary action pulls the molten solder to all surfaces that have been fluxed.

Tinning Steps — Flux is applied to the bottom half of the copper tubing. Since it's good to avoid prolonged heating, torch tip size is selected to bring tubing to soldering temperature in less than 30 seconds.

The flame is directed on the opposite side of the tubing from the flux. When the flux boils, the operator touches the rod to work and solder melts off to flow where wanted.

Even though the flux is now inactive, the residue is washed off with water. This prevents moisture and dirt from collecting and causing corrosion.

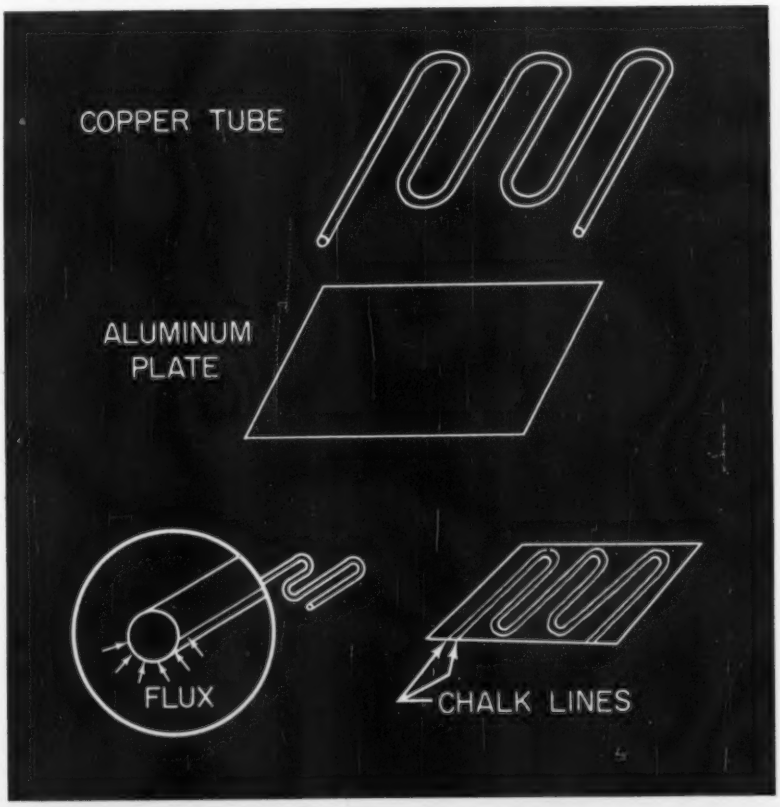
Chalk Retains Solder — With chalk outlining the tubing path on the aluminum sheet, scrubbing with a clean wire brush breaks through the aluminum oxide. With the aluminum sheet at 600°F, the operator tins the path with a tin-zinc rod.

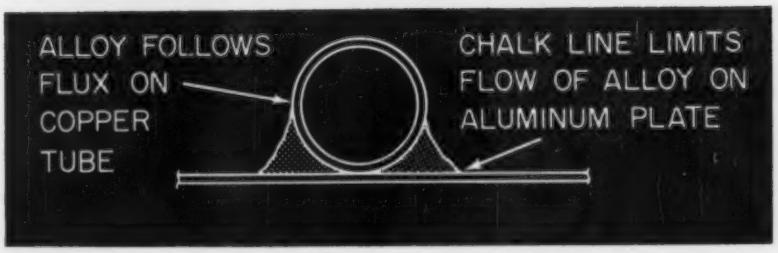
Wire brushing follows the molten streak. The result is a shiny tinned surface to which more solder can be added where necessary.

The final step is to clamp the tubing/sheet assembly between platens, heat to 600°F and let cool. The chalk lines limit flow of solder on aluminum plate. Solder follows flux on tubing for proper fillet.

Available from welding supply distributors, the tin-zinc solder is identified as All-State No. 39, made by All-State Welding Alloys Co., Inc., White Plains, N. Y. The flux is also known as All-State No. 39.

Makes Heat-Conducting Bond





FOR FINE FINISH: One machine combines crush dress and centerless grind. John Storm (r), Van Norman vice president, discusses method with Lee Edwards, Strelinger's president and general manager.

Dual Machine Speeds Grinding

By mating crush-true and centerless techniques, a new grinder saves machine time and speeds finishing of small parts.

Big advantage comes in processing parts to close finish tolerances.

▪ Double up on machining steps and you can net tidy savings. That's what a new production grinder does in combining crush-true and centerless techniques.

Sired by the research and development group of the Van Norman Machine Co., Springfield, Mass., the concept holds promise for both high production and high precision.

Tests in the Field—A number of the machines have been in use in a variety of shops around the country for as much as a year. Work ranges from special aircraft fasteners to typical screw-machine parts.

The latest unit is one of the more spectacular. It takes a ⅜-in. bar of high tensile steel, 30 Rc, cuts it down to size in about 15 seconds.

Rough grinding removes about 0.185 in. of stock. The finish grind, taking off 0.010 in., will turn out a piece every 9 seconds. Finish is 20 microinches rms or better.

Versatile Unit — Lee Edwards, president and general manager of Charles A. Strelinger Co., Detroit, where the unit is installed, finds it one of the most versatile units in the field.

He points out that the same machine will do both the rough and finish grind on this job. With this plan, a couple of hours set up time is involved to change grinding wheel and crush roll.

While this unit has manual down-feed, future installations will have automatic handling, with one unit set up for roughing and a second for finish grind.

Process Problem — Ordinarily, the workpiece would take four setups by other means. Process planners had considered two methods: One was a screw machine setup to turn the profile and finish the smaller center diameters, two 0.35 in. radii and 45° chamfer. The 0.3800 in. OD would be finished to size on centerless grinders.

An alternate proposal was to centerless grind in three operations. The first was to through-feed grind the parts to bring down to the large diameter; then to centerless grind the smaller diameter, and adjacent radii; and finally to finish to tolerance on a diamond formed wheel.

Faster & Cheaper—Instead, the new combined crush dress-centerless method speeds processing, streamlines setups. It side steps through-feed operation and eliminates runout between the smaller and larger diameters in the roughing step.

Strelinger research engineers felt that if all dimensions were ground simultaneously in both roughing and finishing, eccentricity would be minimized. And there's less chance for spinners with resulting costly breakdowns.

Automation Too — Another installation at Detroit Universal Div., Chrysler Corp., points up the high-production potential. There the manufacturing manager, Lee Fow-

ler, explains that the development gives both finish and functional qualities.

He adds, "it fits in well with our ideas for progressive mechanization for processing this part." The part is a four-arm spider forging that is heat treated for wear.

In handling one of the highest volume parts, the new facility has not only mechanized the finish grinding, but most of the machining processes. Pre-machined parts feed down from a storage hopper through a demand-type conveyor.

An automatic feed drops each part into an ingenious holding fixture in the first grinding position. Fingers hold the piece in a free-floating position for the centerless operation.

After two diameters are ground, the part indexes to the second position for the other two diameters.

Close Tolerances — Designs call for holding the four outside diameters to ±0.0005 in. Runout of faces must be held to 0.0008 in.

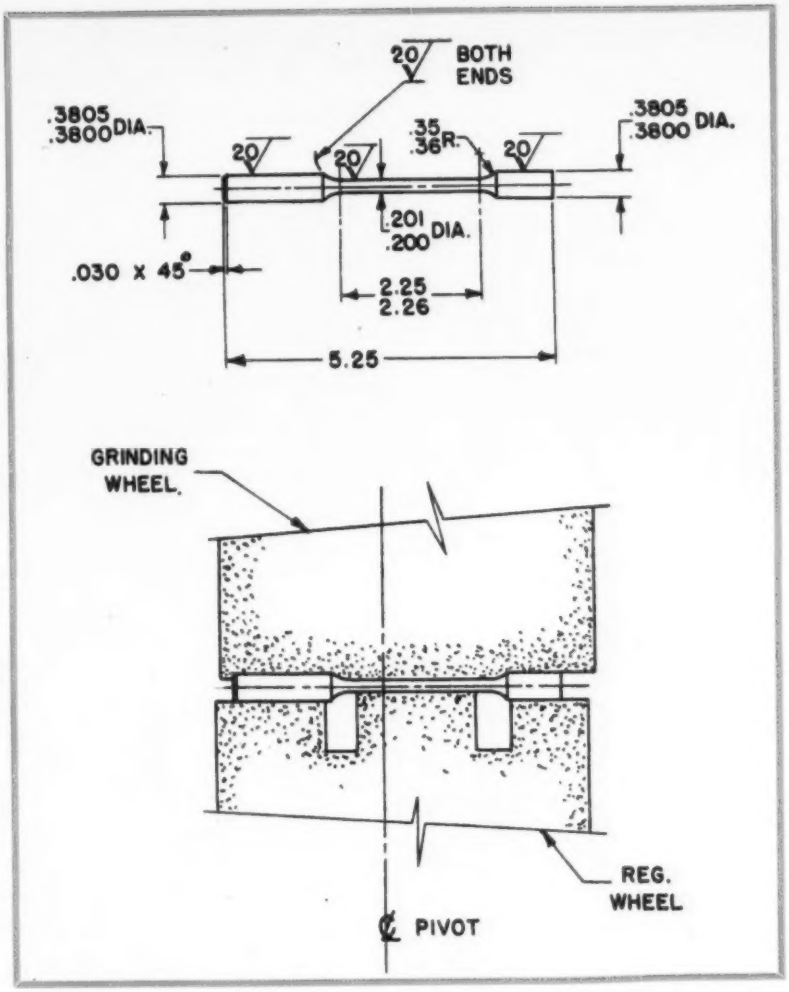
If two successive pieces are produced undersize, the gage shuts down the grinder. For oversize pieces controls make automatic compensation.

The setup utilizes three crush-dress grinding wheels. The outside wheels finish outer diameters, while the broader center wheel does the two inner diameters. The design potential of the two-station grinder is in the neighborhood of 250 pieces per hour.

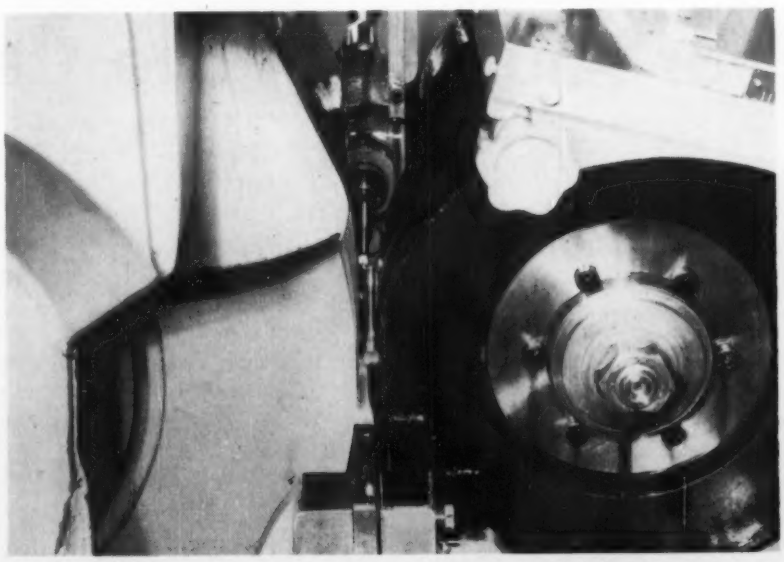
Other Advantages—Crush dressing on centerless operation affords other advantages. For instance, it's possible to retool readily. About all that's needed is a change of wheels and crush form roll.

The machine can even be refitted for conventional diamond-dressed wheel operation, if desired. You can get through-feed, in-feed and profile work with the one unit.

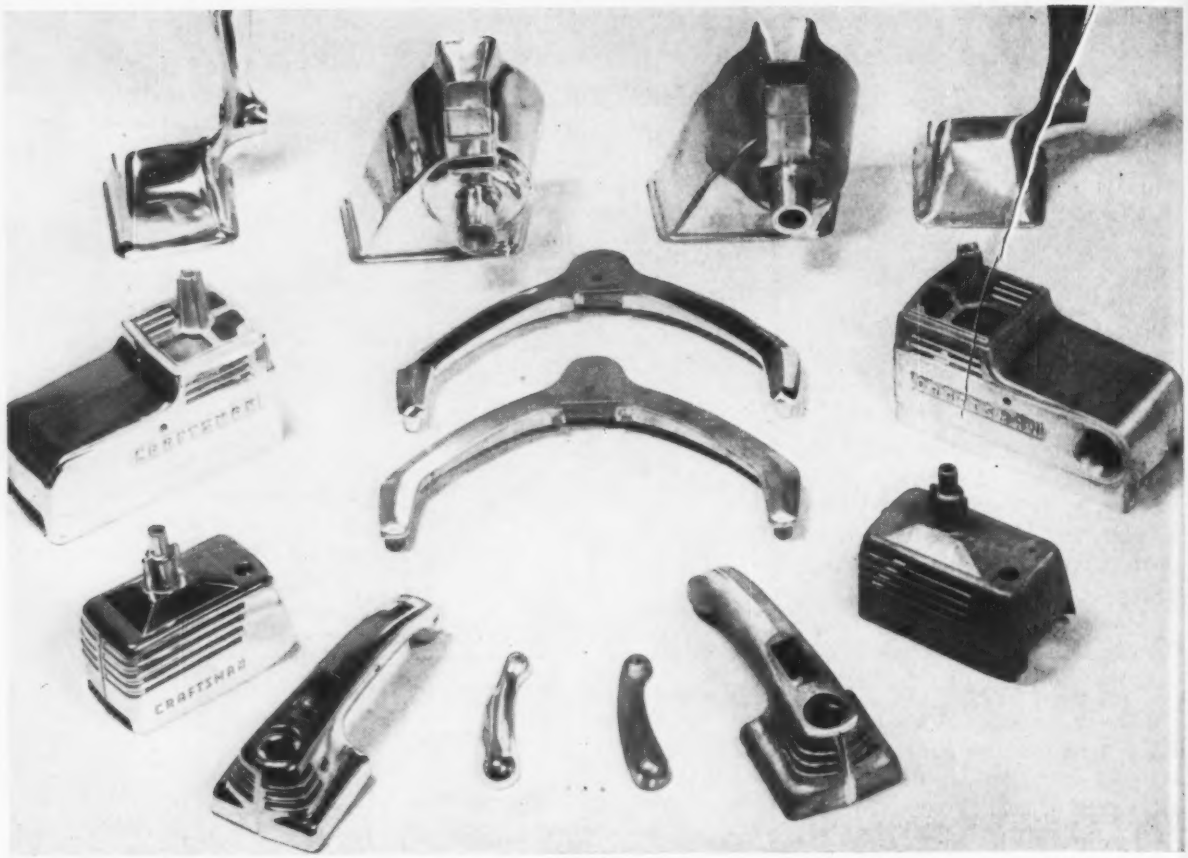
Wheel dressing time is minimized. On typical roughing, up to 600 pieces are produced between dressings; on finishing this may run over 3000 workpieces.



MEETS THE TEST: Combined method finishes vital steering element to 20 microinch rms. Simultaneous grinding insures concentricity.



SIMPLIFIES TOOLING: Wheel is aluminum oxide, 220 grit, open structure, vitreous bond. Crush dressing gives 10 times life of diamond dressing.



WHAT BURNISHING DOES: Acid etch on unburnished parts leads to tarnish-resistant lustrous finishes.

Better Finishes Mean New Uses For Aluminum Die Castings

By **F. M. Metrailer**—General Manager, Kitchen-Quip, Inc., Waterloo, Ind.

Better chrome-plated and ball-burnished finishes on aluminum alloy die castings are possible. An acid etch on surfaces to be finished makes the difference.

▪ Aluminum alloy die castings, despite their light weight and frequent lower-piece-cost advantages, have often been out of the running where chrome-plated parts were needed. It's always been hard to plate these castings uniformly and with assurance the coating would stand up well in service.

Recently, however, both the plating procedure and the finish have been improved. As a result, aluminum alloy die castings can now be plated on a volume basis to compete more successfully with other products.

Tests Prove It—At its Waterloo, Ind., plant, Kitchen-Quip, Inc., produces and plates aluminum die castings on a large scale for a major appliance manufacturer. For use as agitator parts, the castings must have a plated finish that will withstand the effects of soap and detergent solutions. Accelerated tests, equivalent to 10 years of normal service, show that the plating does hold up.

Kitchen-Quip's engineers found that it wasn't the aluminum that caused trouble in plating, it was the alloying elements. They solved

the problem by dissolving these elements out of the surface of die-cast parts without affecting part strength. This is done in an acid bath just before the castings are plated.

Need Smooth Surface—As in all plating operations, however, surfaces must be smooth to insure a good appearance. As-cast surfaces, especially, must be as smooth as possible, otherwise the cost of buffing and polishing them may be prohibitive. Partly for this reason, the plant makes its own die castings.

Parting lines on all castings to be plated are removed first, usually with abrasive belts. This is followed by buffing, polishing, alkali cleaning, rinsing, acid etching as already mentioned, and a thorough final rinse before plating.

Low Cost Burnishing — Where the cost of wheel buffing and polishing isn't justified, the company uses a special ball-burnishing technique it developed. It can precede plating where the best possible appearance is not needed, but it is used most often where the burnished finish is adequate without plating. The process brings savings of up to 65 pct compared to wheel polishing.

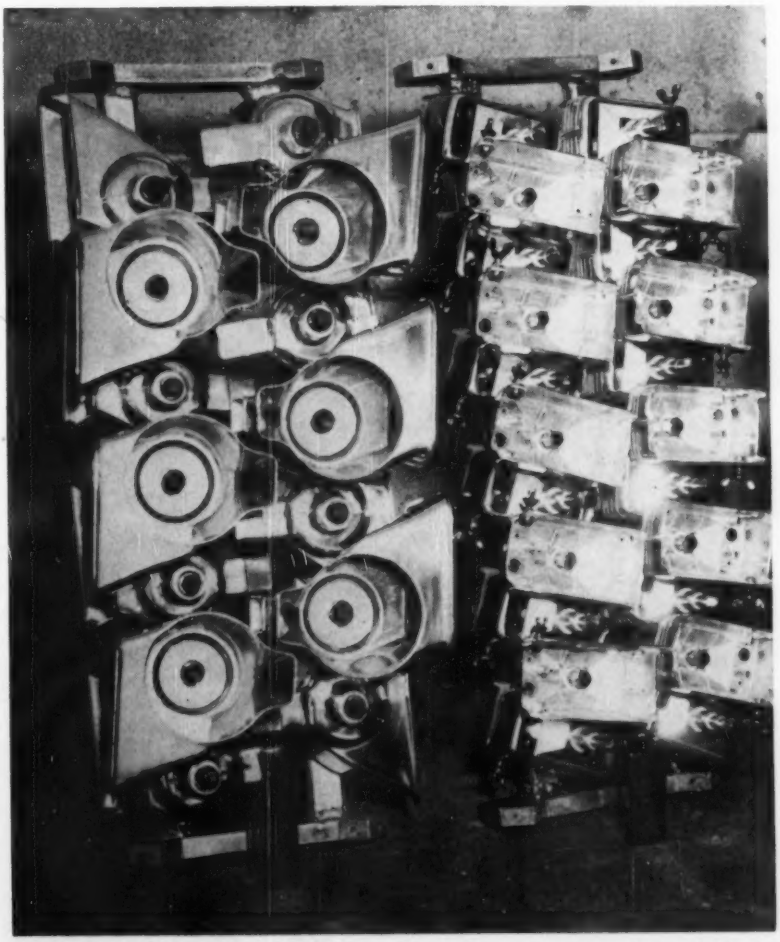
Castings burnished by this technique have a bright, lasting luster. They do not have the impingement marks that often result when parts are tumbled with steel balls in a soap solution. Nor do they finger mark easily.

Etching is Key—As in the plating process, the trick is to ball-burnish a pure aluminum surface. With the alloying elements etched away by acid, burnished surfaces are much less apt to tarnish.

To get this tarnish-free, long-lasting luster, the company burnishes its die castings in a Roto-Finish barrel. Octagonal in shape, it is 30 in. long and measures 54 in. in diam across opposite flats. It is lined with synthetic rubber and has a removable cover on each of the eight faces.

Normally, the barrel contains

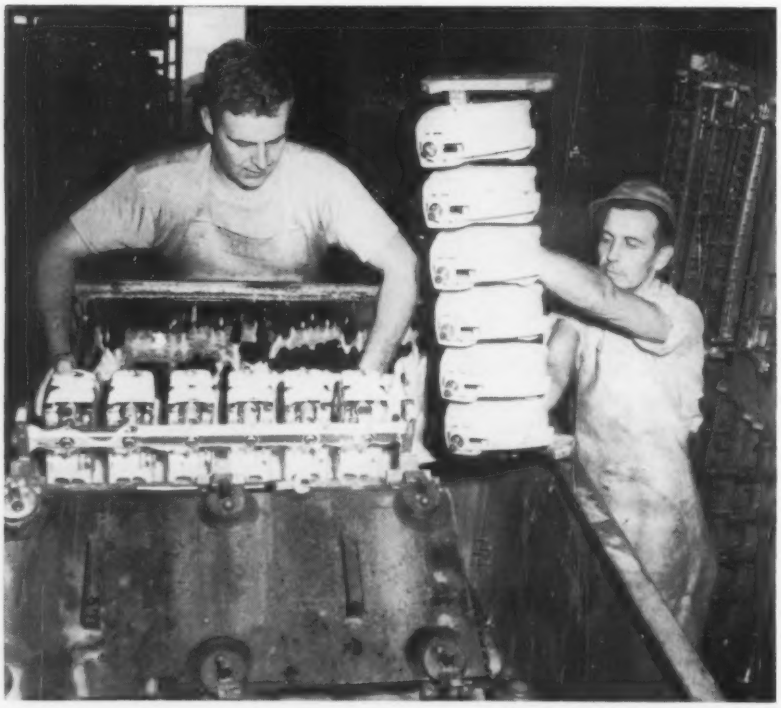
FOR TOP RESULTS: Diecast aluminum agitator parts are rag-wheel buffed before they're chrome plated. Final finish is bright and long lasting.



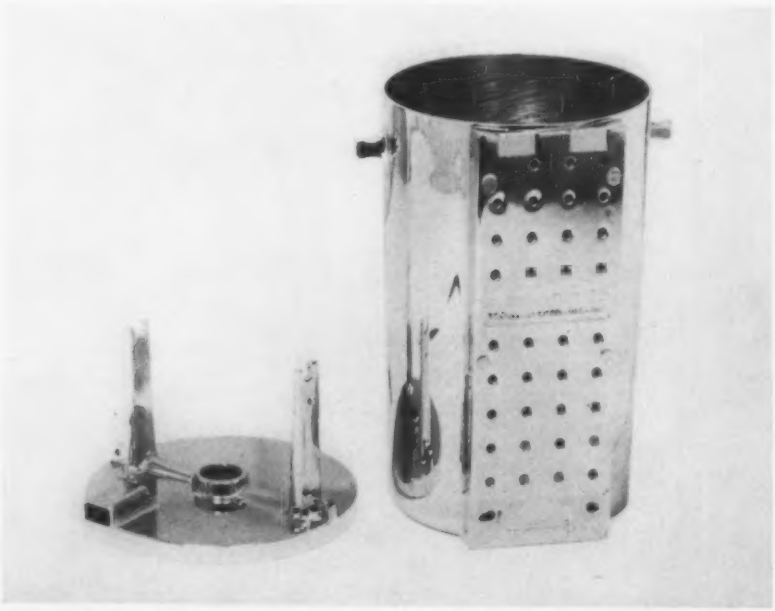
CAREFULLY PREPARED: After acid etching, aluminum die castings are loaded on fixtures for transfer to the ball-burnishing barrel.

2000 lb of ¼-in. and 3/16 in. hardened steel balls. To prevent impact between castings, each one is held in a fixture.

Must Be Clean—Before they're fixtured, however, castings are ground with abrasive belts to remove parting lines. They're then cleaned in an alkaline solution and acid-etched to dissolve alloying elements in the surface layer. This operation is followed by a thorough rinsing, and castings are kept wet until they are fixtured for transfer to the tumbling barrel.



BURNISHING SETUP: Kitchen-Quip uses an eight-sided burnishing barrel, reverse-rotates it during a 20-minute cycle to produce a top finish.



FINE APPEARANCE: Diecast aluminum parts for an ice cream freezer are highly corrosion resistant after being copper-nickel-chrome plated.

At rest, the balls in the tumbling barrel form a mass 16 in. deep. This is covered by 6 in. of water to which compound is added. The barrel is rotated for three minutes in one direction and then for the same time in the reverse direction. Speed of rotation is 21 rpm. Total cycle time is about 20 minutes.

Ship or Plate — Burnished castings are removed from the barrel and rinsed. Following this, they are either dried for shipment or racked for subsequent plating.

Castings racked for plating are solution cleaned for 20 minutes in a semiautomatic tank. A cold rinse follows this. Next comes a short, precisely - controlled, acid - etching cycle and further cold water rinsing. This prepares the castings for the conventional sodium zincate treatment, in which it is important to agitate the workpieces.

Following two more cold rinses, castings are plated with copper. They again undergo two more cold rinses, which prepares them for bright nickel plating. This is done in a semiautomatic Udylite tank using bagged anodes.

Modern Technique—After nickel plating and two cold rinses, castings are chrome plated. This operation makes use of the latest type of bright, crack-free solution and procedure. Two cold rinses and a hot rinse (to speed drying) follow. Drying time is further reduced by passing the casting between infrared heaters.

Total thickness of the plated coating usually ranges between 0.00025 and 0.0015 in., depending on customer specifications.

The company also chrome plates aluminum alloy sand castings successfully. In some cases, a dull finish is applied, primarily for wear resistance. In others, a bright coating is plated onto polished and buffed surfaces.

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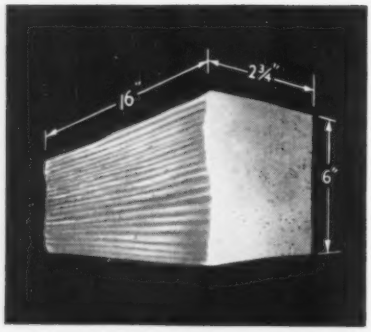

How long did it take to gouge out this 64 cubic inches of steel?

Fourteen hours' time were formerly required to chip 64 cubic inches of metal from a 5-ton reaction-type turbine casting. Using the Arcair cutting and gouging torch the job was done in 1½ hours, saving this company 12½ hours of costly, hard work, not counting clean-up time formerly required — and completely eliminated with the Arcair process!

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THE DOUBLE OVER

From the files of
The American Arbitration Association

▪ A lift truck operator on the second shift at an electroplating company called in sick some time ago. To cover for him a day shift man had to work overtime.

This question arose: Should the substitute be the regular day shift operator who was a fairly new employee? Or should it be the senior man in the department? He wasn't a regular operator but could do the work.

A contract overtime provision said first crack must go to "the regular man on the job." Next came "the man in the department with greatest seniority provided he is qualified to do the work." So management asked the day shift operator to "double over" and he did.

Wrong Guess? — Next day the union filed a grievance. When a day man works the night shift, argued the steward, he's not working his regular job. Just because the same classifications exist on both shifts doesn't make them the same job, he said. Overtime should've gone to the senior man.

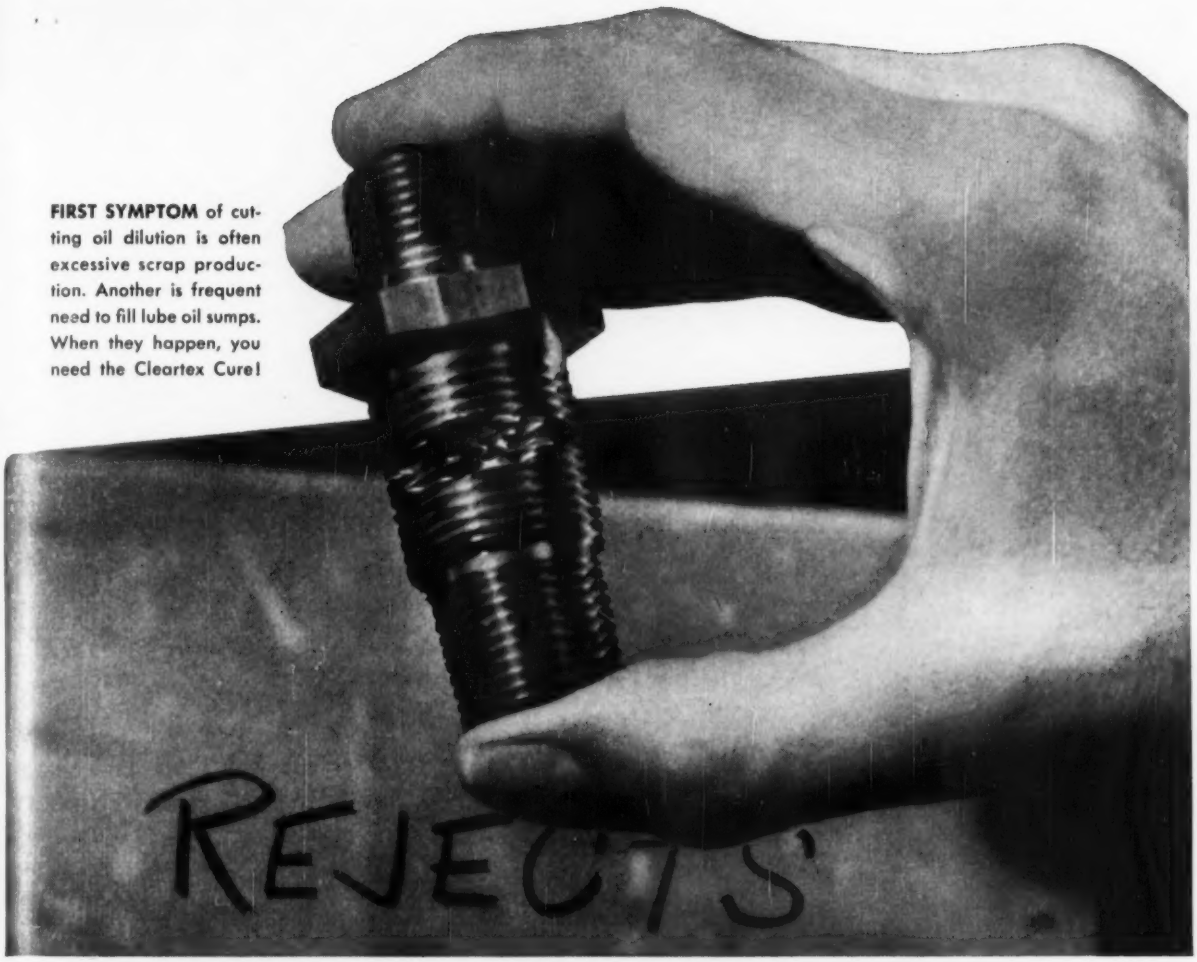
The industrial relations manager disagreed. He insisted that management's original decision was correct, that there was no significant difference between the day shift lift truck job and the night shift job.

The case later went to arbitration. **How would you rule?**

The Arbitrator Ruled:

There wasn't any difference between the day and night jobs. The contract says overtime offers must first go to the regular employee within the classification. Then offers are on the basis of department seniority to qualified employees. When an employee is absent, necessitating overtime, the overtime first must be offered to the senior employee in the preceding shift within the same classification. In the event the classification is exhausted or employees decline, overtime then goes to qualified employees on a departmental basis.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.



FIRST SYMPTOM of cutting oil dilution is often excessive scrap production. Another is frequent need to fill lube oil sumps. When they happen, you need the Cleartex Cure!

Diluted cutting oil can pile up rejects

When you find your scrap production soaring, the villain may be lube oil leaking into the cutting oil sumps of your automatic screw machines. It happens in 7 out of 10 automatics in spite of the most careful lubricating techniques. This dilution will lower cutting oil effectiveness—and, as it loses its efficiency, rejects pile up, tool life drops, and production can go down by as much as 33 per cent!

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 145.

Welding Titanium

Field welding of unalloyed titanium is possible using only conventional inert-gas tungsten-arc equipment. A paper now available discloses two techniques: dry-box welding and air welding. (Linde Co.)

For free copy circle No. 1 on postcard, p. 145

Steels, Alloys

High temperature steels and alloys are listed on a data card. It supplies: composition of each alloy, its base material, density, rupture strength data at various temperatures and short time properties at room temperature and at 1200°F. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 2 on postcard, p. 145

Fork Lift

How a fork lift raises 4000 lb 22½ ft or 6000 lb 12 ft (at 24-in. load centers) is explained in a bulletin. Forward and reverse speeds of the 4-wheel drive unit are 18 mph. (Kwik-Mix Co.)

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Partitioning

Expanded metal partitioning shown in a 4-page bulletin features quick and easy erection. Special fittings assure this. The expanded metal enclosures can form an almost unlimited variety of cages, separations, etc. (The Globe Co.)

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Conveyors

Hinged pan conveyors for quench tanks, scrap movement, foundries and machined part handling are featured in a 4-page bulletin. (Anchor Steel & Conveyor Co.)

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No-corrode Coats

Corrosion-proof coatings are discussed in a bulletin. It points out that no one coating can resist every type of corrosive fumes and splash. Some withstand abrasion better. Choice of the proper coating is important. Surface preparation is also explained. (Atlas Mineral Products Co.)

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Safety Switch

A bulletin describes a switch which automatically halts power when a hoist or crane approaches the overload stage. (W. C. Dillon & Co., Inc.)

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Forming Shear

A machine which shears, forms and pierces is outlined in a 4-page bulletin. The machine performs: square hole cutting, contour cutting, louvering, beading, circle cutting, slot cutting, hole piercing, nibbling, joggling, edge bending, flanging and planishing. (Lennox Tool & Machine Builders).

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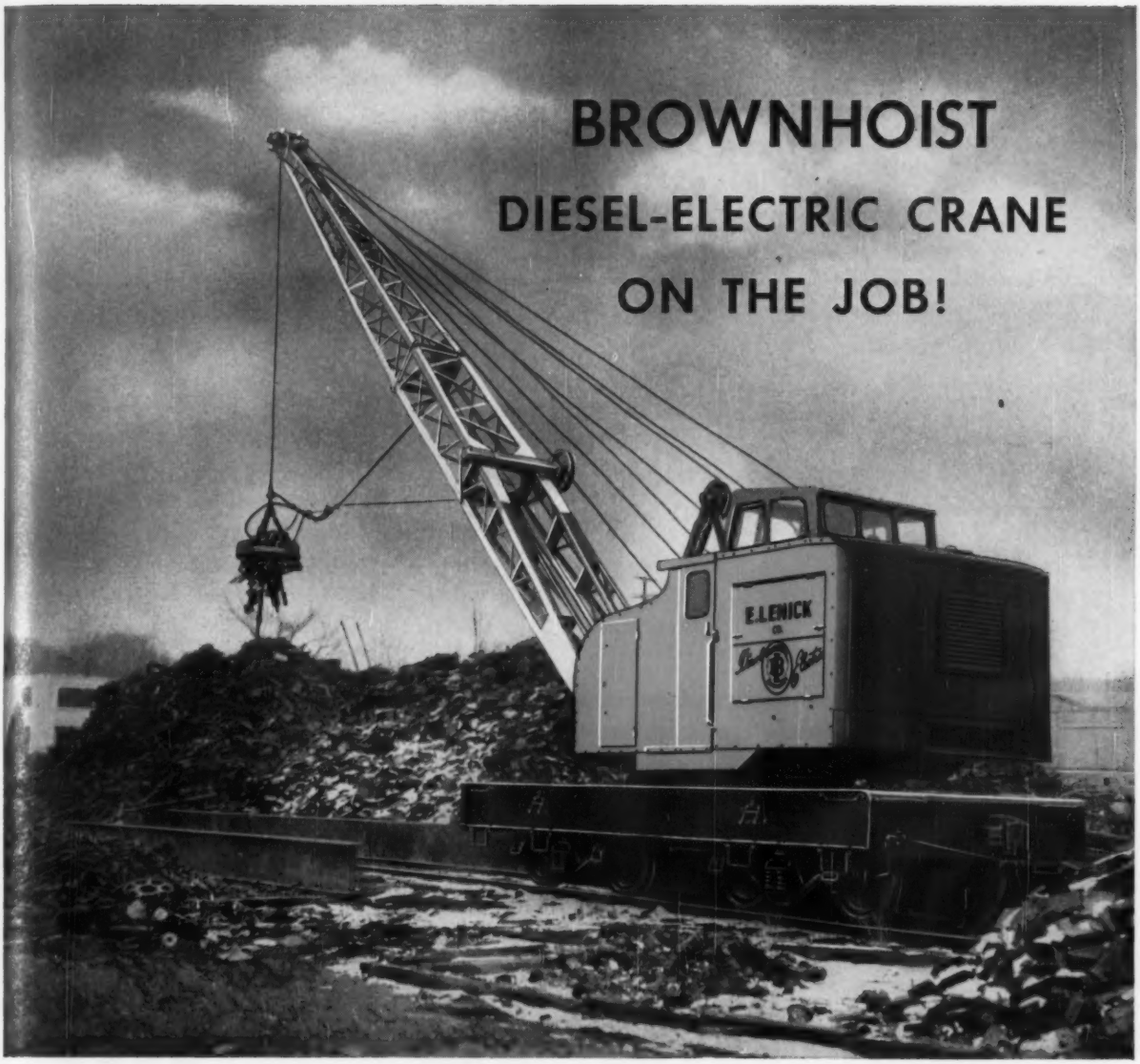

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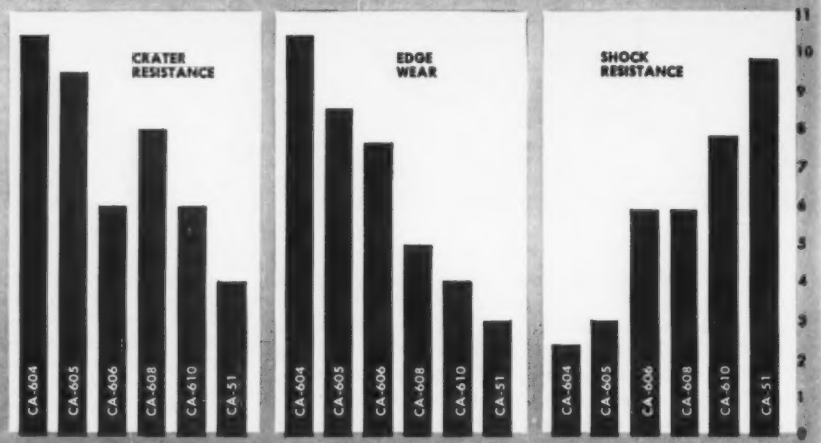
This chart shows how grades in the CA-600 Series compare in crater resistance, edge wear resistance and shock resistance. The units of measurement indicate only relationship between grades, not efficiency.



Write for new Catalog C-16

Carmet Cemented Carbides for Industry

This 32-page first edition contains prices and complete specifications on Carmet's full line of cemented carbide tipped tools, Indexable Inserts, blanks and holders. Speed and feed charts, grade comparisons and ordering information included.

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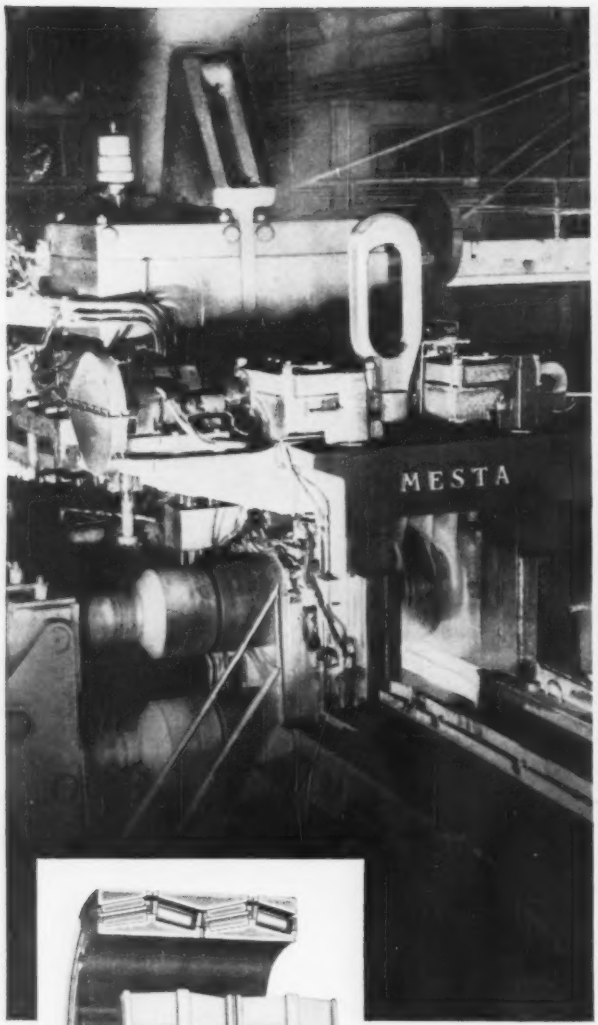

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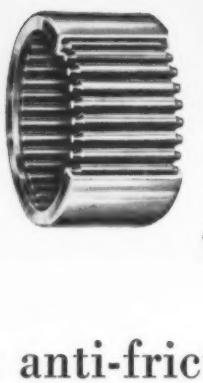

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A lexicon to untangle complex terminology of brass mill products is available in booklet form. (American Brass Co.)

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Coated Abrasives

A kit is available which makes it easier to specify coated abrasives. The kit contains: a buyer's guide, a selector chart for metalworking operations, and a compact brochure on basics in coated abrasives for metalworking. (The Carborundum Co.)

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Computer Operation

Cam profile calculations with the Univac 120 computer is the subject of a booklet. (Remington Rand Univac Div., Sperry Rand Corp.)

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Truck Attachments

Attachments for powered industrial trucks are presented in a 4-page folder. (Elwell-Parker Electric Co.)

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Building Products

A 12-page booklet features aluminum industrial building products. (Kaiser Aluminum & Chemical Sales, Inc.)

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Silicon Alloys

Silicon alloys are subjects of a leaflet. It lists 13 grades of ferrosilicon. Silicon contents of these vary from 22 to 95 pct. Three grades of silicon metal are also listed. (Vanadium Corp. of America).

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Gray Iron

Called "Designer's Digest," a new bi-monthly news sheet gives up-to-date tips on gray iron casting design. It presents ways to reduce casting costs. (Gray Iron Founders' Society).

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Power Elevating

A 4-page bulletin describes a power attachment for portable elevating trucks. (The American Pulley Co.)

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Gear Shavers

Rotary external gear finishing machines are detailed in a 4-page bulletin. They cut away metal in tiny, hair-like chips. A serrated rotary cutter gives high surface finish. (Michigan Tool Co.)

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Casting Alloy

High strength aluminum casting alloy is analyzed in a brochure. (Navan Products, Inc.)

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Air Filters

Renewable-media automatic air filters are described in a bulletin. Media won't drip even up to 150°. Nor will it lose adhesive qualities to dryness. (American Air Filter Co., Inc.)

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Steel Strapping

A method of unitizing freight car roof sections is reviewed in a report. It's done with heavy-duty steel strapping. (Acme Steel Co.)

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Industrial TV

Industrial television cameras appear in a bulletin. One closed-cir-

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FREE LITERATURE

cuit model is for use where there's extreme noise. (Kin Tel Div., Cohu Electronics, Inc.)

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Fasteners

Fasteners and tools for aircraft, missile and related uses are covered in a catalog. To keep pace with new rivets, many new units to drive stainless steel and harder material collars appear in the catalog. (Hi-shear Rivet Tool Co.)

For free copy circle No. 34 on postcard

Power Transmission

Power transmission equipment is presented in a 4-page bulletin. Briefly described are: speed reduction drives, screw conveyor drives, adjustable speed drives, motor bases, and conveyor and split pulleys. (American Pulley Co.)

For free copy circle No. 35 on postcard

Wire Cloth, Mesh

Which alloy may solve your wire cloth problem? To this question a 15-page booklet gives answers for filters, dipping baskets, core-support structures, etc. It discusses merits of various nickel alloys. (International Nickel Co., Inc.)

For free copy circle No. 36 on postcard

Tubing

Now you can get a chart which lets you calculate tube size required to machine to a finished dimension. It helps eliminate guesswork and material waste resulting from overguessing to be on the safe side. (Peter A. Frasse & Co., Inc.)

For free copy circle No. 37 on postcard

Air Motors

A bulletin describes 12 models of air motors. Designed for extra heavy duty service, the motors range from 11½ to 20 hp. They have output shaft speeds from 19 to 800 rpm at rated horsepower. Direct drive models with standard flange, NEMA D flange or foot mountings and geared drive models with foot mountings are shown. (Joy Mfg. Co.)

For free copy circle No. 38 on postcard

Diesel Engines

Diesel engines shown in a dozen-page catalog serve automotive and industrial jobs. It gives ratings and dimensions on more than 100 engines. (Detroit Diesel Engine Div., General Motors Corp.)

For free copy circle No. 39 on postcard

Valves

Cast steel gate, globe, angle, and swing check valves are covered in a 20-page folder. (Kerotest Mfg. Co.)

For free copy circle No. 40 on postcard

Pressure Gages

Introduced in a catalog is a new, completely safe gage case for high pressure applications. Its safety features include: a safety wrapped tube to smother any explosion; a removable armor plate dial-backing to confine explosive force. (Kunkle Valve Co.)

For free copy circle No. 41 on postcard

Gear Trains

Outlining a new concept in design of servo-mechanism gear train packages is a 16-page booklet. It details use of stock instrument plates and cluster gears in providing low-cost precision assemblies, with a minimum of design and engineering time. (PIC Design Corp.)

For free copy circle No. 42 on postcard

Lift Trucks

A 12-page brochure announces new pneumatic-tire lift trucks. Capacities range from 6000 to 8000 lbs at 24-in. load center. (Hyster Co.)

For free copy circle No. 43 on postcard

Millivoltmeters

A 28-page catalog covers operating principles, specifications, features and ordering information on noncontrol and control millivoltmeters. (Minneapolis-Honeywell Regulator Co.)

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NEW...from Philadelphia Gear

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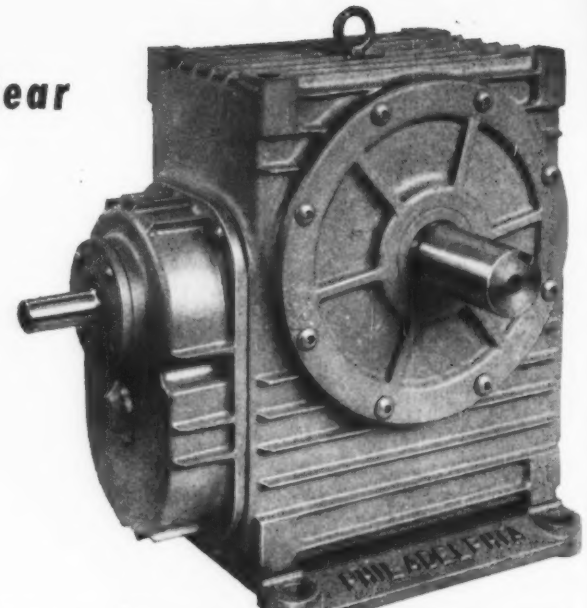
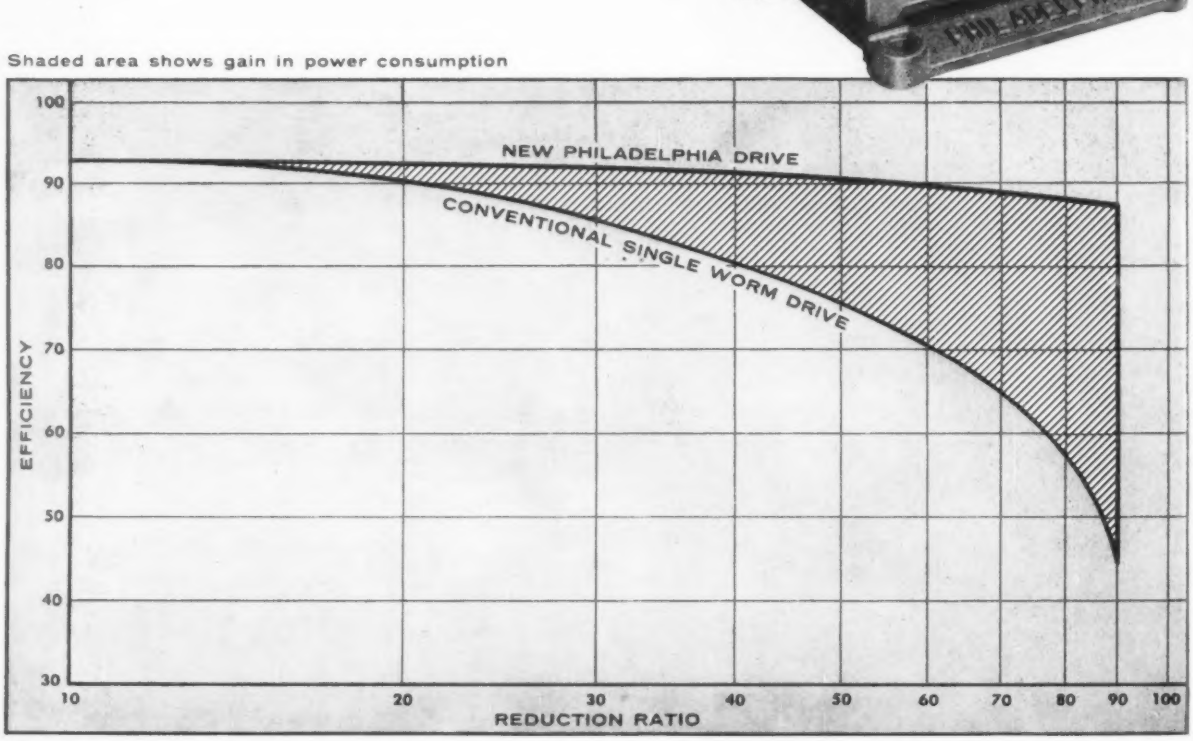


Now you can get increased efficiency in worm gear drives —see curve. Helical attachments for double and triple reduction units combine the efficiency advantage of helical gearing with the high ratio advantage of worm gearing. You save on power consumption . . . high operating temperatures will never be a problem.

Shaded area shows gain in power consumption



New flexibility. One basic housing design plus standardized mounting bases, gearing, helical attachments and torque control attachments permit fast assembly from stock. You can get *any* drive arrangement, *any* mounting arrangement, in the exact size and ratio to meet your specific requirements. Torque control attachments for all sizes are available from stock for applications demanding overload protection.

New high capacity. This is not just a re-rated line. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, sturdy housings, helical attachments with ground gearing . . . all mean higher capacity in less space. In fact, you get space savings to 50% . . . weight savings to 60%. Ratios from 5⅛: 1 to 1212: 1. Center distances from 3″ to 21″. Write for catalog data today.

philadelphia gear drives

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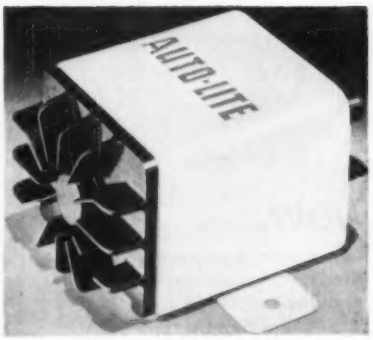
New Materials and Components

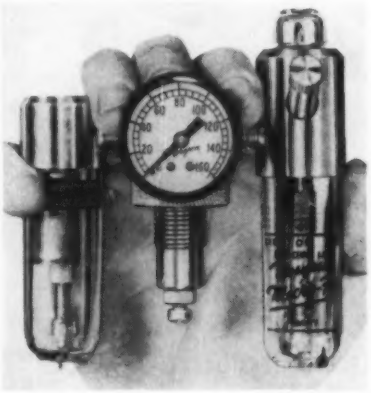
Transistor Ignition Fits Regular Engines



Completely compatible with regular automotive engine electrical components, a high-voltage transistor ignition lifts the ceiling placed on engine design by conventional ignition systems. It's contained in a single package slightly larger than an ignition coil, which it replaces. It fits into any battery ignition system in minutes. In addition to long-range significance to designers, the new unit spells the following advantages right now: (1) maintenance-free ignition; (2) lifetime distributor contact service; (3) elimination of condensers; (4) no starting failures or poor starts due to "blued" contact points. (Electric Auto-Lite Co.)

For more data circle No. 45 on postcard, p. 145

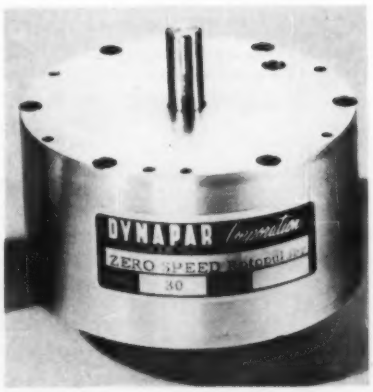
Lubricating Units Are Very Small and Compact



Lubricating control units needn't take up much space. Two new models prove this. One, for ¼-in. pipe installations, measures only 7½-in. wide, 5½ high, 3¾ deep. The other is even smaller. For ⅛-in. pipe installations, it's just 4½-in. wide, 4¾ high, 3 deep. Both provide complete and efficient processing of compressed air for service to air cylinders, air chucks, air tools, bearings and other machine components. Models come for air flows from 0.05 to 20 cfm. Each unit consists of: an air filter, a pressure regulator and a micro-fog lubricator. Small air filters remove corrosive liquids and abrasive solids from the air stream, preventing damage to connected air equipment. The pressure regulator adjusts over a 5 to 100-psi pressure range. (C. A. Norgren Co.)

For more data circle No. 46 on postcard, p. 145

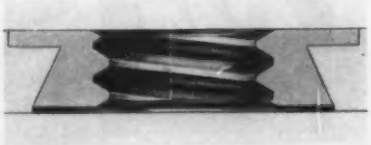
Pulser Gages Efficiency of Machine Movements



Especially effective for automation setups, new pulse counters continuously measure virtually any physical quality which can convert into shaft rotations. Such movements include: length, rpm, linear or angular position, belt speed, motor slip, etc. These rugged transistorized counters generate up to 1200 counts per revolution. They measure length down to 1/100th-in. increments with a 12-in. circumference counting wheel. Operating speeds can range above 10,000 rpm (with constant output at all speeds). Units may operate 100 ft or more away from control equipment with no loss of reliability or accuracy. Units have no gears or contacts. They measure just 3½-in. diam, 1¾-in. long, weigh only 20 oz. All components are rated at five years life. (Dynapar Corp.)

For more data circle No. 47 on postcard, p. 145

Fastener Fits Flush on Both Sides of Sheet



Self clinching, this fastener mounts flush on both sides of the sheet in which it's used. Dropped into drilled or punched holes, the flush fastener applies easily with a pneumatic or oil-hydraulic squeezer or a mechanical press. Metal displaced by the head flows around the

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back tapered shank. This securely locks the fastener into the sheet. Resulting push-out resistance is high. Hex shape of the embedded head provides high torque resistance, too. Made in type 303 stainless with thread sizes from No. 2-56 to No. 10-32, it's suitable for use in aluminum alloys, brass, copper, cold rolled steel and similar sheet materials in thicknesses from 0.061 in. up. (Penn Engineering & Mfg. Co.)

For more data circle No. 48 on postcard, p. 145

Tinned Wire

Tinned wire for fabricators of formed wire products has a bright finish. It retains this brightness for a long period of time in normal use. Relatively easy to work, the tinned wire comes in almost any temper and analysis in medium

low carbon and low carbon steels. Fine wire comes in 16 through 30 gage, in 8-in. diam coils; coarse wire, 20 gage through 5/16 in., in 16 and 22-in. diam coils. (Continental Steel Corp.)

For more data circle No. 49 on postcard, p. 145

Grease Cups

Automatic self-feeding lubrication with visible control for all plain or anti-friction bearings is provided by new grease cups. The cups have a 4-oz reservoir. A vented clear, unbreakable plastic cylinder allows an easy view of lubricant supply. Each cup's spring and weighted plunger feeds grease to a bearing with predetermined pressure. A protective valve seats when cup is

full. This prevents grease from entering the bearing. Cups eliminate hit-or-miss greasing practices. (Lubriquipment Engineers, Inc.)

For more data circle No. 50 on postcard, p. 145

Steel Chain

Of low carbon steel, new chain has a spiral loop design. This design gives it more heat-transfer surface. Shorter lengths thus are necessary to effectively dissipate heat. The design also eliminates concentrations of wear. Inside diameter is always greater than twice the cross-sectional area, hence no kinking. Chain also comes in stainless or any material that can be cold-formed. (Allis-Chalmers Mfg. Co.)

For more data circle No. 51 on postcard, p. 145

Machine Components

Produced from wear-resistant copper-base alloys, new extruded rectangles are available in 46 sizes. They are free from slag inclusions, porosity and piping. Depending upon rectangle size, mechanical properties of this extruded alloy range from 100,000 to 108,000-psi ultimate tensile strength, 50,000 to 55,000-psi yield strength and 200 to 230 Brinell hardness. The rectangles have use as slides, wear plates, gibs, ways, etc. (Ampco Metal, Inc.)

For more data circle No. 52 on postcard, p. 145

Thread-cutting Screws

A new tapping screw cuts a machine screw thread as it's turned in. The screw is for fastening in castings, forgings, sheet metal, structural steel and other materials. (Parker-Kalon Div., General American Transportation Corp.)

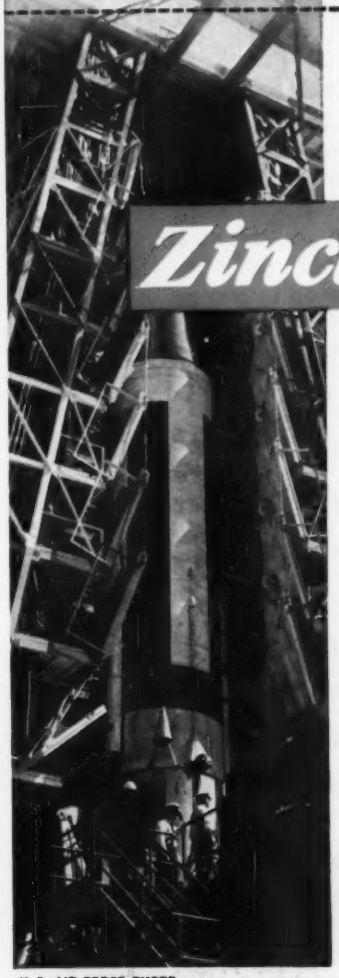
For more data circle No. 53 on postcard, p. 145

Thermal Switch

Weighing ½ oz, a high temperature bimetal thermal switch hooks up to contacts for either close-on-rise or close-on-fall in temperature. It's calibrated at 600°F maximum, —20°F minimum, with a possible

WEBSTER

gal-va-nize (găl/və nīz/), *v.t.* 1. to simulate by or as by a galvanic current. 2. to coat (metal, esp. iron or steel) with zinc.



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close temperature tolerance of 2°F under laboratory conditions. Temperature differential and repeatability for a given switch is about 1°F. An overshoot to 800°F or undershoot to —100°F can be tolerated. The switch can be mounted by lugs, soft soldered directly to, or recessed into the surface to be controlled. It gives precise surface temperature measurement for applications such as aircraft and airborne electric equipment. (Control Products, Inc.)

For more data circle No. 54 on postcard, p. 145

Blind Rivets

Advantages of blind riveting include: good setting speeds, accessibility, uniformity and low cost. Now you can add another: pressure tightness. A new blind rivet seals its joint air and water tight to pressures up to 500 psi. It also resists vibration. The rivet is set by pulling a mandrel into the rivet shank, spreading and setting it. Sealing results automatically on setting due to the rivet's design. The mandrel's head is encased within the rivet;

it seats tightly against a shoulder formed during setting. Rivets presently come in 0.125 and 0.187 in. diam in aluminum. (Pop Rivet Div., United Shoe Machinery Corp.)

For more data circle No. 55 on postcard, p. 145

Patterned Steel

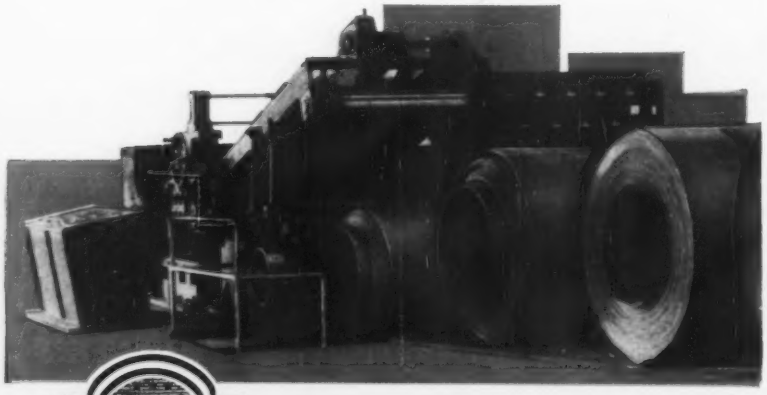
Wide rolled-in pattern steel sheets have uses in automotive, appliance and building products. The patterned sheets suit any application where decorative appeal is wanted, plus steel's strength, formability and economy. Available in commercial or drawing quality, the pattern sheets come in a variety of gages and widths in cut lengths or coils. Any pattern which can be drawn on paper can be impressed into the steel. The pattern becomes part of the metal and the design is limited only by the severity of the draw. (Pittsburgh Steel Co.)

For more data circle No. 56 on postcard, p. 145

Lock Nuts

In spite of its small size and light weight, a new hex nut actually has more cubic content of metal supporting its threads than former sheet metal NAS679 types. This gives high wrench torques and great fatigue life for the thread. The new fastener is part of a series which replaces up to 19 assorted hex nuts. The series lets users standardize procurement and inventory. Nuts come in a chrome-moly vanadium

Stamco **heavy gauge feeding equipment and trimmers** save you money. Saves operating time and increases production. A single operator can quickly feed gauges up to ½" thick with Stamco electrically and hydraulically operated coil strippers and unwind equipment.



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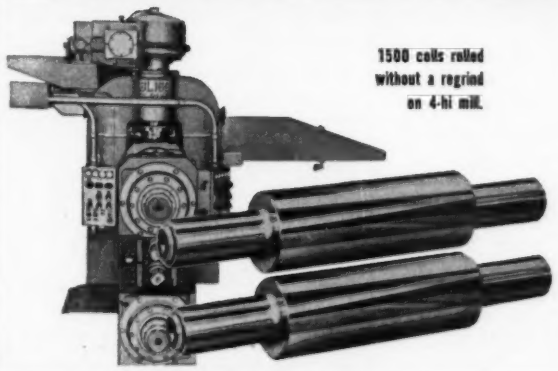
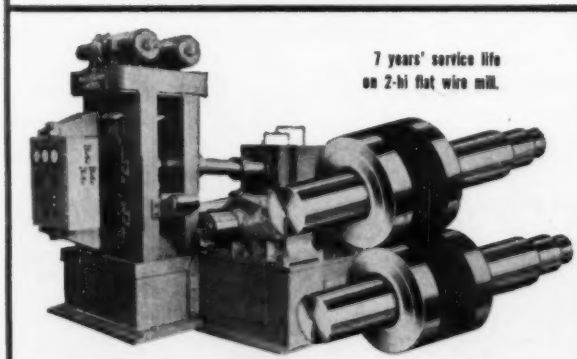
Talide rolls have proven far superior to both steel rolls and carbide rolls of any other make. They are ultra-hard, extremely dense and porous-free. Strip steel of all analyses can be rolled down to thinner gauge, with more accuracy, greater reductions and with fewer anneals than possible with any other roll.

During the last six years Talide rolls have been adopted by every major strip steel producer. Metal Carbides pioneered and developed tungsten carbide rolls and successfully adapted them to all types of rolling mills including STECKEL, BLISS, UNITED, MESTA, STANAT, SENDZIMIR, WATERBURY-FARREL, TORRINGTON, RUESCH, FENN, WEAN, COLD METAL, etc.



1500 coils rolled without a regrind on 4-hi mill.



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- ★ HIGHER SPEEDS
- ★ CLOSER TOLERANCE
- ★ IMPROVED PHYSICALS
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Broken or damaged carbide rolls can be re-worked to first class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

Talide Rolls are made in lengths up to 100", diameters up to 25", and up to 5000 lbs. by weight.

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The Superset diamond grinding wheel was specially developed for grinding carbide rolls to highest possible surface finish and luster. Made of 4-8 micron size diamond dust, it imparts a surface finish far superior to any other commercial wheel. Available in sizes up to 25" diameter.

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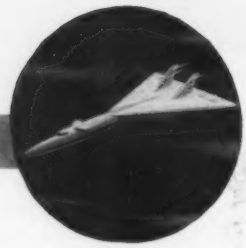
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY



PROGRESS REPORT

Internally-cooled blades and vanes for gas-turbine engines

THE NEED—Present uncooled gas turbines have bumped against the top thermal limits of the metals currently used for turbine components. Only by finding ways to increase the turbine inlet temperatures without affecting temperatures of such parts as turbine blades and vanes can gas-turbine engines of greater thrust and efficiency be made.

THE OBJECTIVE—An investigation was made in the TAPCO Group of Thompson Ramo Wooldridge Inc., to develop a way to produce internally-cooled blades and vanes. By cooling these parts, turbine inlet temperatures can be increased as much as 200°F over present limiting temperatures. This increase should permit much higher thrusts to be developed.

Cooling of turbine components can be achieved either by air or water. Air-cooling seems to be more convenient to apply. For this reason, TAPCO investigations have been directed to the production of blades and vanes with internal air passages.

THE METHODS—Fabrication methods reviewed includes powder metallurgy, casting, rolling, forging, and extrusion. TAPCO established projects on rolling, forging, and extrusion methods.

THE RESULTS—Practical methods have been developed at the TAPCO Group for drilling holes economically in such alloys as Udimet 500, Waspalloy and other blade materials.

Extrusion of pierced preforms has been accomplished by the TAPCO Group.

TAPCO engineers and metallurgists have developed practical methods of rolling pierced preforms to produce blades of accurate finished size and contour while maintaining the integrity of internal air passages during forming operations.

Both tapered and straight air passages have been achieved by methods and equipment suitable for mass production of air-cooled blades.

Limitations on the commercially feasible rolling of air-cooled blades and vanes have been established after considerable research on several rolling methods.

TO SUM UP—The TAPCO Group of Thompson Ramo Wooldridge Inc. is able to produce air-cooled blades and vanes from materials currently available to meet the requirements of gas-turbine manufacturers for higher turbine inlet temperatures. When may a TAPCO engineer call to give you complete information and design data?

TRW

TAPCO GROUP

Thompson Ramo Wooldridge Inc.

Dept. IA-359 • Cleveland 17, Ohio

alloy steel, with nickel cadmium diffused plating for 160,000 psi at 550°F, 90,000 psi at 900°. (Boots Aircraft Nut Corp.)

For more data circle No. 57 on postcard, p. 145

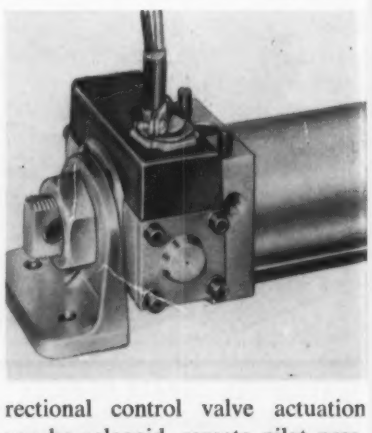
Furnace Controls

Tight, uniform control of time and temperature in heat treat furnaces is maintained by a new electronic system. The system's key element is an electronic timer. This presets for both time and temperature through two phases of the heat treating process. Once preset and the furnace started, they cannot be changed or tampered with. (The A. F. Holden Co.)

For more data circle No. 58 on postcard, p. 145

Air Cylinder

Space and weight savings and simple installation are key assets of new air cylinders. They feature built - in - directional and exhaust speed control valves. The cylinders come in 1½, 2 and 3-in. bore sizes in any desired stroke length. Di-



rectional control valve actuation can be solenoid, remote pilot pressure, button-bleeder, or combination solenoid - button bleeder. Mountings are completely interchangeable. (Modernair Corp.)

For more data circle No. 59 on postcard, p. 145

All-weather Motors

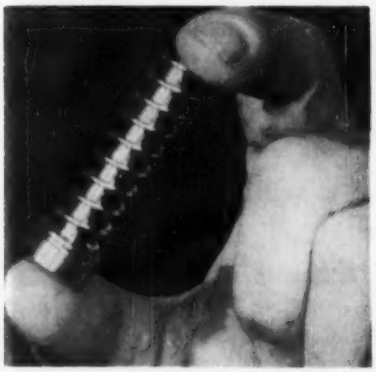
All-weather vertical hollow-shaft motors now come in ratings of 1 to 30 hp. Compact design assures space savings and handling ease.

Motors' insulating materials provide high resistance to moisture and chemical contaminants. Construction makes possible in-the-field assembly or removal of coupling and thrust bearing in five minutes using only a wrench. (The Louis Allis Co.)

For more data circle No. 60 on postcard, p. 145

Freezer Component

An instant freezing unit for refrigerators measures only 2-in. long and ⅜-in. diam. It's a tiny steel cylinder, the complete evaporator for a Freon-12 refrigeration system using standard parts. Only special part is a small helical conveyor that



removes ice flakes from the cylinder's exterior. The unit can make 20 lb of ice per day, under American Society of Refrigerating Engineers test conditions. Under ordinary household conditions 50 lb of ice per day will result. Potential applications exist wherever flake ice is being used, or liquids must be cooled. (A. J. Ross Enterprises).

For more data circle No. 61 on postcard, p. 145

Gas Controls

Precision built, compact new controls fit small gas appliances and similar items. Basically, the control units operate manually for use on console heaters, bathroom heaters and vented and recessed wall heaters. Each incorporates an "A" cock, a "B" cock, automatic pilot and gas pressure regulator. The controls also are available with a pressure tap. For automatic control of the appliance, units can be supplied with a snap action hydraulically operated thermostat; this

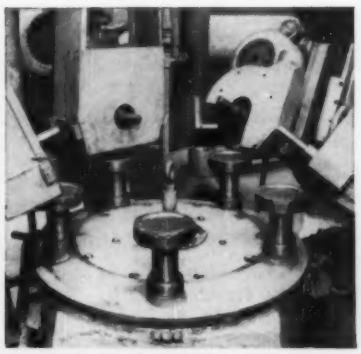
OSBORN®

BEFORE BRUSHING—Clutch back-up plate has sharp edges . . . carries fine chips and burrs inside teeth.

AFTER BRUSHING—Edges and surface junctures are uniformly precision blended. Chips and burrs are thoroughly removed to help assure troublefree performance.

Auto maker races to a perfect finish

. . . cleans, blends 450 parts-per-hour with OSBORN Power Brushing



4 POWER BRUSHING HEADS plus a 6-station index table setup produce a quality finish for automotive clutch parts. Osborn Monitor® Brushes — working at 1750 rpm — automatically deburr and blend 450 parts-per-hour in this low-cost operation.

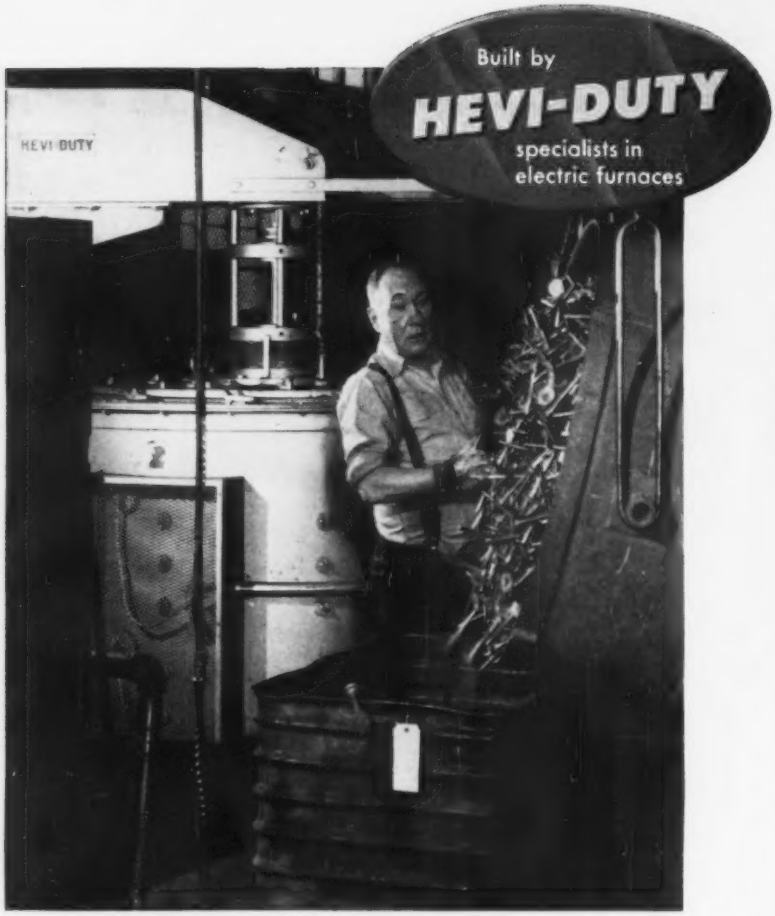
THESE clutch back-up plates—product of a leading auto manufacturer—are quality finished at high production rates with versatile, low-cost Osborn Power Brushing.

The job requires blending sharp edges and surface junctures of the intricately shaped parts . . . plus thoroughly removing fine metal chips and burrs that could later cause trouble in the clutch assembly. *This Osborn rotary power brushing setup does the entire blending and deburring job rapidly, uniformly, economically. Rate: 450 parts-per-hour.*

Low-cost precision finishing like this can be applied to many types of products you build today. An **Osborn Brushing Analysis**—made in your plant at no cost or obligation—can pinpoint where *you* can speed production . . . improve quality . . . cut costs with modern power brushing methods. Write or wire us for details. *The Osborn Manufacturing Company, Dept. F-79, Cleveland 14, Ohio.*

Osborn Brushes

BRUSHING MACHINES • BRUSHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY



Here come 10,000 valves
. . . and all with uniform hardness

Even heat throughout a dense, 2,000-lb load . . . 10,000 uniformly hardened valves every time . . . valves free from distortion with no rejects.

Eaton Manufacturing Company's Valve Division in Battle Creek, Michigan, expects and *gets* performance like this from their Hevi-Duty pit furnaces. The furnaces are used 24 hours a day for the age-hardening of valves for automotive and industrial engines. An efficient baffle and fan system provides an even rate of heating throughout the dense load, adding to over-all uniformity.

Eaton purchased five small Hevi-Duty pit furnaces early in World War II. Exceptional performance by these furnaces led to the addition of larger units to meet increased demands. All units have given excellent service. None have required more than normal maintenance since installation.

If uniformity is important in your work, investigate Hevi-Duty furnaces. Write for Bulletin 646.

- **Heat Processing Furnaces**
- **Dry Type Transformers**
- **Constant Current Regulators**

HEVI-DUTY ELECTRIC CO.
Milwaukee 1, Wisconsin

DESIGN DIGEST

is sensitive to return air flow. Automatic operation utilizing a wall thermostat can be accomplished by addition at the factory of a 24-v

heat motor type automatic valve. (Grayson Controls Div., Robertshaw-Fulton Controls Co.)

For more data circle No. 62 on postcard, p. 145

Expansion Joints

Flexible bellows expansion joints just introduced have a test-rated cyclic life. Initial production of the stainless steel flexible piping components includes 3- to 30-in. nominal pipe sizes for applications up to 275 psi and 750°F. They're for use where space is restricted or where high costs make it impractical to use conventional offsets and loops to handle the strains brought about by thermal expansion or contraction of the piping material. (Tube Turns Div., Chemetron Corp.)

For more data circle No. 63 on postcard, p. 145

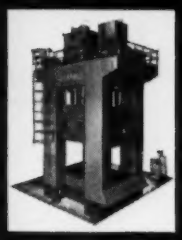
Pipe Coupling

Combining its maker's compression sealing design with inherent advantages of aluminum, a new coupling is both strong and lightweight. In sizes 2- to 6-in. OD, the coupling permits up to 6° pipe deflection. It handles up to 150-psi working pressures and safely absorbs vibration, expansion-contraction and other piping stresses. Only joining tool required for it is a wrench. (Dresser Industries, Inc.)

For more data circle No. 64 on postcard, p. 145

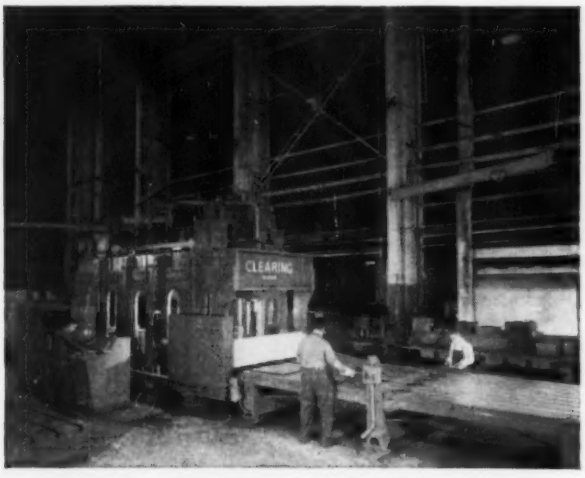
When it comes to Hydraulic Presses...

large or small



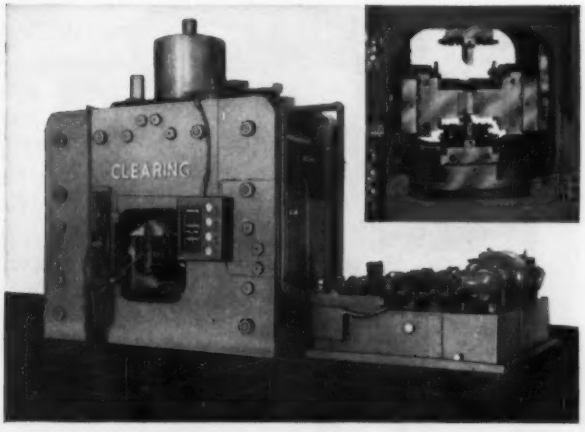
FOR ANY TYPE OF APPLICATION such as these metalworking drawing presses

WITH SPECIAL FEEDING EQUIPMENT as shown on this metal bonding machine



WITH ANY TYPE OF CONTROLS as seen on this rubber pad forming press

AND COMPLETE WITH THE TOOLING YOU NEED FOR THE JOB as we designed and built for this briquetting press



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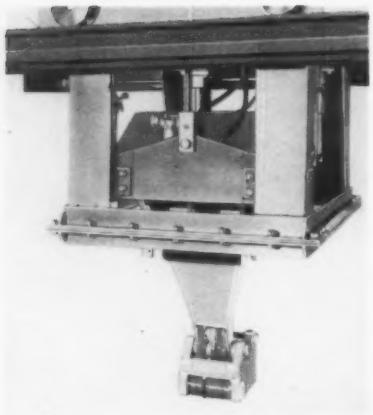
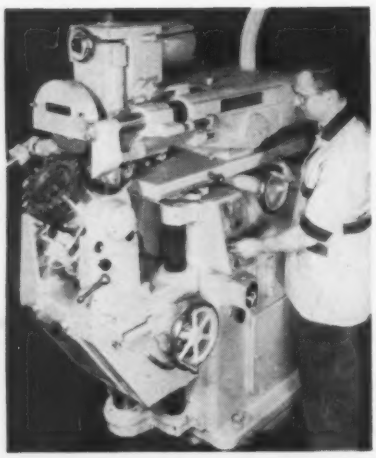
New Equipment and Machinery



Punch Cards or Pushbuttons Run Slab Marker

High speed, easy, safe marking of slabs and blooms is done by this remote-controlled marker. Sitting at a remote console, the operator need only push a button to move the marking wheel into any desired position. This instead of setting each wheel by moving it one character at a time with each depressing of a control. Such easy, fast setting-up makes possible operation by punch card systems. The marker stamps up to 12 characters with each marking head. A special raising and lowering unit allows vertical positioning of marking through a 24-in. bloom. It will clear 30-in. over the table rolls. Vertical movement is through two worm gear jacks actuated by a heavy-duty gear reduction motor. Height of the marking head in the stamping position indicates on a large gage. An automatic system oils all shafts and wheels. (M. E. Cunningham Co.)

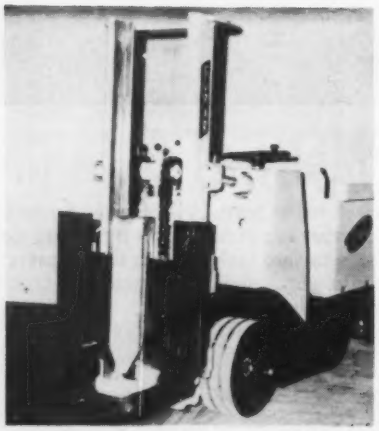
For more data circle No. 65 on postcard, p. 145



Grinder Boosts Large Cutter Output, Quality

Labor savings in the grinding room and increased production in the machine shop are twin aims of the maker of this cutter grinder. The grinder is automatic; thus one operator can tend more than one at a time, reducing toolroom costs. Quality grinds resulting from mechanical control of grinding action mean long cutter life, high accuracy and fine finishes. This can mean getting substantially more work from large tools. The grinder does a complete sharpening job on a wide range of milling cutters. It grinds on the outside diameter as well as the face and bevel of any cutter within its 4 to 20-in. diam capacity. The machine spin-grinds newly fitted cutters to size. A built-in dust collector protects all moving parts. As the grinding wheel wears, spindle speed automatically increases so that surface speed stays constant. The wheel automatically dresses with every stroke. (Ingersoll Milling Machine Co.)

For more data circle No. 66 on postcard, p. 145



Lift Attachment Holds Loose Tin Plate Sheets

Magnetic action lets a new lift truck attachment handle loose sheets of tin plate with ease. It holds the sheets during transporting on a pallet. The attachment securely grips the load to prevent any slipping or tipping. A magnetic control switch on the truck cowl has a maintained contact position to energize the magnet for securing the load. An "off" position of the switch de-energizes the magnet for removing the load or for standard fork truck operations. Even though trucks using the magnetic attachment are especially for moving loose sheets of tin plate, they can be used for other pallet handling operations. The attachment does not reduce truck capacity. It's readily removable for re-installation on longer forks. (Elwell-Parker Electric Co.)

For more data circle No. 67 on postcard, p. 145

US PowerGrip

THE ORIGINAL BELT WITH TEETH

The U.S. PowerGrip "Timing"® Belt is one belt that delivers POSITIVE drive, non-slip performance all the time. During the eight years since it was patented by "U. S." this "Timing" belt with teeth has been popularly referred to as the "T" belt.

So indispensable has this "Timing" belt become that thousands of plants, girding for power and automation, are using the T belt. It not only gives non-slip performance, it will never stretch and will outlast all others. Besides, it requires no lubrication, no maintenance. And since this belt requires virtually no initial tension at installation, think of how this prolongs bearing life.

Your U. S. Power Transmission Distributor carries a full line of stock sizes, has the experience and engineering know-how to help you convert quickly and easily.

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Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.
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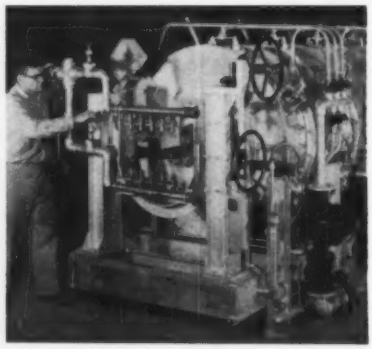
NEW EQUIPMENT

Furnace Line

Three strands of stainless steel tubing get annealed at the same time in this continuous furnace line. The six-barrel-furnace line measures only 15½-ft long over-all. It accommodates tubing from ⅝ to 5-in. OD. Rated production is 1985



pph (based on 2-in. OD. tubing at 3.72 fpm). Automatic temperature control is in three zones, delivering tubing at 2100°F to the quench located at discharge end. Each barrel unit has five gas-fired burners. (Selas Corp. of America).

For more data circle No. 68 on postcard, p. 145

Tiny Reamer

Of solid carbide, a miniature reamer can be sized with accuracy to millionths in less than 15 minutes. It comes in two sizes: 1/16 and 1/32 in. Its design gives the tool great rigidity, long cutting life and reduces breakage. (Microtron, Inc.)

For more data circle No. 69 on postcard, p. 145

Hardening Furnace

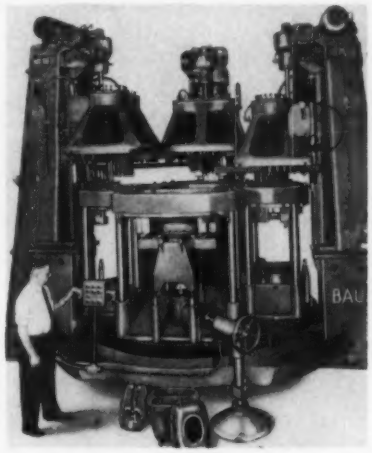
A giant controlled atmosphere hardening furnace just built has bottom load and discharge facilities. The furnace shell is 11-ft diam by 35-ft deep. It's welded gas-tight throughout. This prevents contamination by air. The shell accommodates a loading fixture with a work load 24-ft long by 6-ft 8-in. diam. Its work chamber is lined with high quality lightweight insulating refractory. This is backed by courses of medium and low tem-

perature insulating slabs. Heating elements for 2050°F are of 80-pct nickel, 20-pct chromium. These mount on the refractory in tiers providing 500-kw in five zones of control. The furnace is on four wheels on 18-ft centers. Rails let it travel along the 57-ft long furnace pit. A motorized winch with an alloy chain lifts the work load into the furnace chamber. Control of the furnace door, winch and furnace travel is via a pushbutton control station. This is built into one side of the furnace base structure. (Lindberg Engineering Co.)

For more data circle No. 70 on postcard, p. 145

Driller, Tapper

A new mechanical leadscrew feed unit drills, taps and reams. It's designed to reduce maintenance, insure steady feed, eliminate surge and lengthen tool life. The flexible, versatile machine tool shown uses three such units. This machine contains a 124-in. diam automatic rotary table with four indexing stations. It handles drilling, tapping and reaming of 39 different parts. The three vertical multiple spindle units have 27 x 40-in. rectangular heads. They feature completely automatic cycling for high production. Semi-automatic cycling provides for low production. A jog cycle allows for setup. Each head is bored for 32 spindles with 32 1½-in. diam upper spindle drivers arranged for two speeds and a neutral position. Feed ranges from 0.005 to 0.090 ipr; spindle speeds, 130 to 1050 rpm. (Baush Machine Tool Co.)



For more data circle No. 71 on postcard, p. 145

Adjustable Wrench

Adjustable wrenches boasting a safety locking device now are available in 4, 6, 8, 10, 12, 16 and 20-in. sizes. The locking feature holds exact jaw openings, automatically, when wrenches are in use. It consists of two teeth in the wrench body which mesh with grooves in the spring-loaded knurl. This holds the set jaw openings

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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America's Most Complete Line of Industrial Fasteners

LIMA 54-T Places USAF's 15-Ton Atlas on its Base for First Public Showing

A LIMA Type 54-T truck crane launched the first public appearance of the USAF's Atlas missile when it raised the mighty ICBM from its specially built base at the Air Force Association's air power Panorama in Dallas, Texas. The Atlas, worth several millions of dollars requires careful handling to protect the over 30,000 parts it contains to give it a 5,000-mile range at speeds to 16,000 m.p.h.

Precision Control for Delicate Operation

The 15-ton Atlas was set up-right on its base from a horizontal position on its special trailer bed. The delicate operation was accomplished with deceptive ease by LIMA's power-packed truck-mounted 54-T crane, equipped with 100′ boom. Radius from center of rotation to the spreader bar at pickup point was 89 feet. The operator said he simply kept the load on boom point and used the 54-T's torque converter for perfect control. It's on jobs like this that owners and operators appreciate the stability, maneuverability and smooth effortless control of LIMA cranes. Their unparalleled stability permits the use of long booms at low angles and extra high reaches.

There's a LIMA to fit your particular job. Cranes to 110-tons capacity, shovels ½- to 6-cu. yds., dragline capacities are variable. A choice of crawler, truck or wagon mountings are available. See your nearby LIMA distributor now for full details or write to us.

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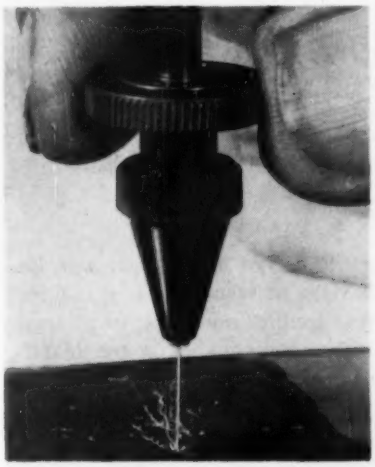
BALDWIN BLH LIMA-HAMILTON

from creeping or changing when the wrench is removed temporarily, dropped or knocked against machinery or fittings. (Proto Tool Co.)

For more data circle No. 72 on postcard, p. 145

Small Driller

For use on milling machines, jig borers, lathes and drill presses, this precision tool drills small holes quickly, easily. Simply lock it into position and control drilling pressure with your fingertips. It's said

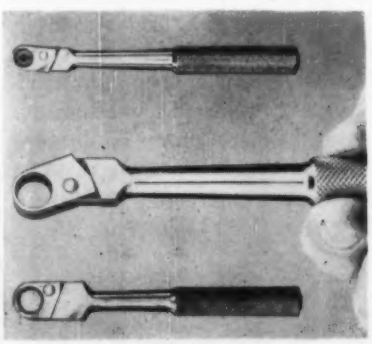


to practically stop drill breakage. Drills stay sharp longer because the user "feels" correct cutting pressure. (Hunter Tool Co.)

For more data circle No. 73 on postcard, p. 145

Ratchet Wrench

Close-clearance wrenching operations can be handled with this small ratchet wrench. Outside diam-



eter of the wrench head doesn't exceed the diameter of the head flange on a twelve point screw. This means there's no overlap to interfere when

Pictured left is Julius Lowe, Development Engineer of the Burroughs Corporation, inspecting a batch of tempered brass stampings in the Vibraslide at the Detroit plant of the Burroughs Corporation.

"Wherever There's Business There's **Burroughs**". . . and Burroughs world-wide service to business is backed up by a program of continuous improvement in manufacturing methods and product quality.

Burroughs uses VIBRASLIDE to remove hard to reach inside diameter cut-off burrs from a wide variety of types of bushings more uniformly and at a lower cost than with any previously used manual or mechanical method.

Parts too fragile for any other mechanical method, such as .002" thick tempered brass stampings, are economically deburred in VIBRASLIDE.

If your product demands PRECISION FINISHING that other methods have not been able to attain, VIBRASLIDE, with its new vibration force, will mean improved quality and lower costs for you.

Write today for detailed literature . . . arrange for a demonstration on your parts, at a demonstration center in your area.

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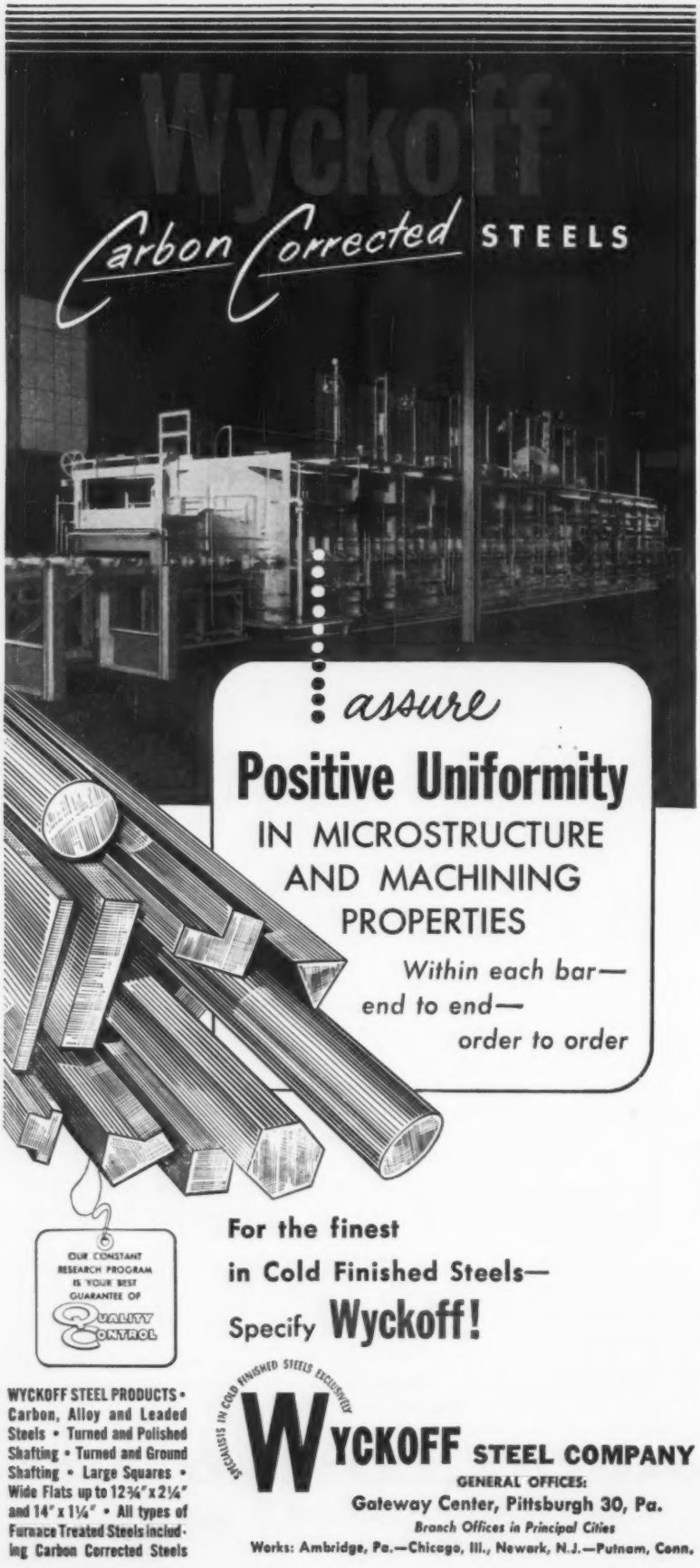
mf inc.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PROPERTIES
Within each bar—
end to end—
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For the finest
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NEW EQUIPMENT

bolting in tight places. A tool of the same type is also available for hex-head bolts and nuts. (Milbar Corp.)

For more data circle No. 74 on postcard, p. 145

NEW BOOKS

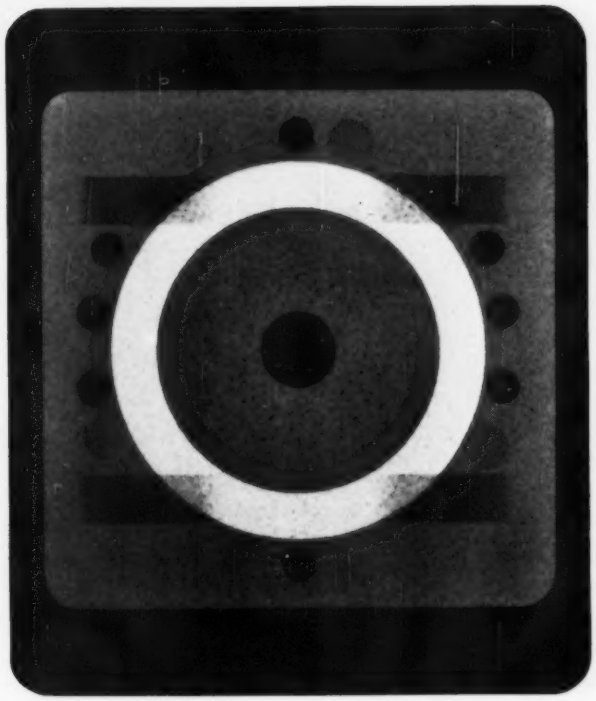
"Vacuum Metallurgy" is an authoritative collection of 27 lectures covering virtually the entire field of vacuum metallurgical techniques and applications. It does a particularly fine job of detailing arc and induction melting processes. Editor is R. F. Bunshah. 472 pp. $12.50 per copy. Reinhold Publishing Corp., 430 Park Ave., New York 22.

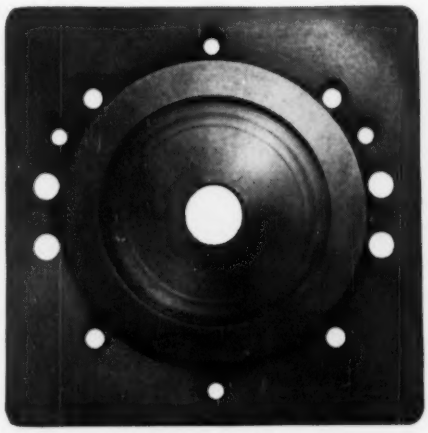
"Effect of Surface on the Behaviour of Metals" is a wrap-up of four lectures on basics. In common with other volumes in the Institution of Metallurgists series, it provides surprising coverage in relatively little space. Most metallurgists will find it helpful. 100 pp. $10 per copy. Philosophical Library, Inc., 15 E. 40th St., New York 15.

"Reliable Electrical Connections" contains some metalworking coverage, though mostly it's electronic. Ultrasonic welding, soldering, copper and aluminum conductors, corrosion and other subjects directly concern the metals field. However, most of the book deals with things like: "Are coaxial connectors reliable?" and "Soldered connections for elevated temperatures in airborne weapons systems." 286 pp. $7.75 per copy. Engineering Publishers, GPO Box 1151, New York 1.

"Kaiser Aluminum Foil" is 99 pct about foil and 1 pct about Kaiser. It covers foil making, converting processes, and end uses from "A to Z". In fact, it would be difficult to find a product maker or

Radiograph shows porosity which caused markings to be fuzzy





Alloy casting for faceplate of aircraft instrument

End of a fuzzy face

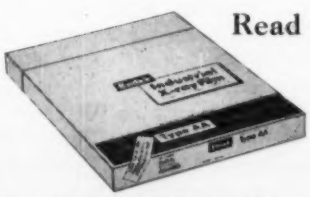
SEE-AT-A-GLANCE clarity is an absolute *"must"* for aircraft instruments. So when one in development appeared with fuzzy numbers and index marks on its face, the cause and cure had to be found.

Sperry Gyroscope Company maintains a large and efficient x-ray testing department, hence the casting for the instrument face was promptly radiographed.

What the radiograph revealed was marked porosity. The conclusion was that the material used in applying the figures was being absorbed and sharp delineation was impossible. Therefore, a change in casting technic was indicated.

This is typical of the ways radiography helps the foundryman make sure only satisfactory work is delivered—make sure he is building and keeping a reputation for high-quality castings. If you would like to know how it can help you, call your x-ray dealer—or the Kodak technical representative—and talk it over.

X-ray Division . . . EASTMAN KODAK COMPANY . . . Rochester 4, N. Y.



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Dr. Kent Van Horn photographed with electron microscope. Photograph by Bruce Davidson

DOCTOR VAN HORN GETS THE "GREEN LIGHT"

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designer who wouldn't be able to use at least four or five ideas in this book. End uses, new ideas, laminating, extrusion coating, coating, printing, forming and fastening are covered. Included are some 350 illustrations, an index, cross-references, and a glossary. 244 pp. $12.50 per copy. (No cost if request is on company letterhead.) Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago 11, Ill.

"Field Inspection of Building Construction" is not a textbook; it delves into no theory. It's just a day to day manual for builders, engineers, and architects. 337 pp. $9.35. F. W. Dodge Corp., 119 W. 40th St, New York 18

"ASTM Standards Relating to Plastics" includes 191 standards, 43 of which are new. 1108 pp. $8 per copy. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

"Executive's Guide to Handling People" is chock full of things most executives already know. But somehow in the hustle and bustle of business, many overlook them. This book is to the executive what other works are to engineers. It doesn't teach you how to become one. But it reviews things gained through years of experience and education. Even a few new up-to-date items are included which you may never have come across. Nothing in the book is pure theory; it deals with methods in successful use today. 208 pp. $4.95 per copy. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y.

"Punched Cards" (2nd Edition) discusses information processing for science and industry. Much of it covers filing systems. It describes machine-controlled cards rather than card-controlled machines. Some 25 pages detail an international classifying and punch-card filing setup for metallurgical literature; 56 pages consider cards as aids to spectrographic analysis. A chapter tells about searching metals literature. Some punch card users feel a more-inclusive book might be desirable. If not this, then one with fewer chapters on specialized jobs. The book would be more valuable if the reader could understand and apply all its contents. 697 pp. $15 per copy. Reinhold Publishing Co., 430 Park Ave., New York 22.

"Forgings" is section 9 of the American Drafting Standards Manual. $1.50 per copy. American Society of Mechanical Engineers, 29 W. 39th St., New York 18.

"Pricing in Big Business" tackles four questions in a unique case-history fashion: How do big firms set prices? Who decides? What do executives think of the firm's price policies? What are implications on the general economy? A compact review like this may indicate it's a dry economics text; it is not. Clear and interesting, it views the subject through eyes of many leading managers. 344 pp. $5 per copy. The Brookings Institution, 722 Jackson Pl., N. W., Washington 6, D. C.

"Coated Abrasives" tells why sandpaper's descendents offer advantages to today's and tomorrow's metalworkers. Sponsored by the Coated Abrasives Manufacturers Institute, it covers: coated abrasive making, new machines, and coolants and lubricants for use with them. 426 pp. $8.50 per copy. McGraw-Hill Book Co., 330 W. 42nd St., New York 36.

"The Atom & The Energy Revolution" introduces nuclear power generally. Little it contains will be news to metalworking executives whose firms long have been in atomic research, testing, vessel fabrication, etc. It's more for readers with limited knowledge of the subject. Also, being interna-

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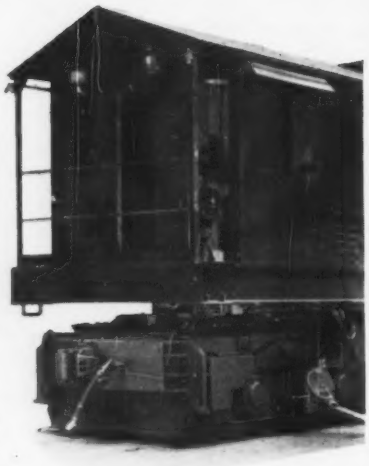
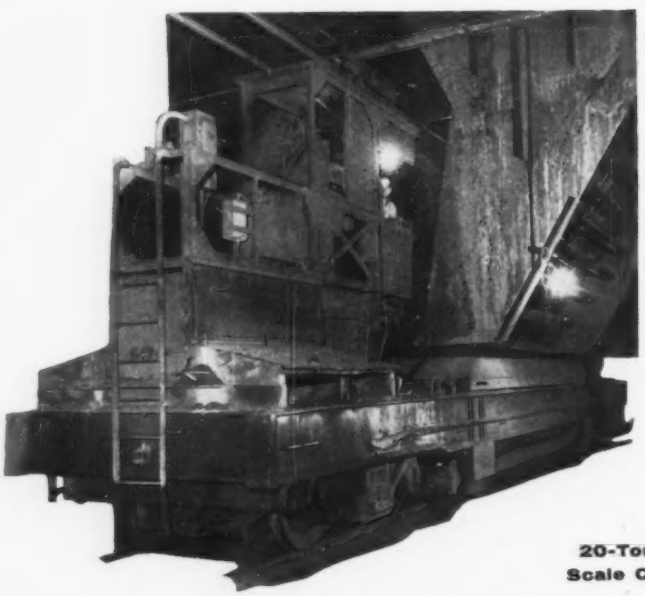
and rugged

ATLAS

CARS



are built to fulfill
performance expectations



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tional in scope, it gives nuclear metals firms an idea of future overseas markets and competition. Moreover, metals producers might use the book to see which nations are pushing ahead in the atomic energy revolution. Cheaper, more plentiful electricity can bring other revolutions in output of aluminum, magnesium, electric-furnace steels, and other metals. 200 pp. $6 per copy. Philosophical Library, 15 E. 40th St., New York 16.

"Mounting Dimensions of Lubricating & Coolant Pumps for Machine Tools" is sponsored by ASTE, MCTI, SAE, NMTBA, and ASME. 12 pp. $1 per copy. American Society of Mechanical Engineers, 29 W. 39th St., New York 18.

"Failure to Success in Selling" is autobiographical. Key things about this book are: (1) Prentice-Hall is the publisher; (2) Dale Carnegie recommends it. The author begins by telling he was a failure at 29, shy and scared, a "97-lb sales weakling." Then he shifts into high gear, roaring through nearly 300 pages, most in the first person. Like many works of this type, it's a paradox, simultaneously repelling and attracting. Since every supervisor and manager must be a salesman of a sort, it could be profitable, at least entertaining, reading. Steel service center customers or PA's often are immune to gimmicks, so this book should be taken with a grain of salt. 277pp. $4.95 per copy. Prentice-Hall, Inc., 70 Fifth Ave., New York 11.

"Lindsay's International Register of Wire Rod & Strip" has a worldwide reputation. Since it includes wire firms names free, it contains many more than directories that charge for listing. It also contains many tables on wire, cables, wire cloth, etc. Though American readers won't care if they miss them — they're covered in a score of U. S.

directories — the international list lacks many American names. This a big disadvantage to both American exporters and overseas users of the directory. 248 pp. 25 /- per copy ($3.50). Overseas Publishers Representatives, 29 W. 34th St., New York 1.

"Material Handling" is a short, short, simple, basic booklet which goes free to school instructors. 12 pp. 50¢ per copy. Material Handling Institute, One Gateway Center, Pittsburgh 22, Pa.

"Soviet Research in Fused Salts" contains articles translated from five Russian journals. Technical, "meaty" and well-translated, the subject comes in two parts. Part 1 covers systems (binary, ternary, quaternary reciprocal); part 2, electrochemistry. Part 2 covers aluminum, magnesium, corrosion and theory. Some of this material has already appeared in U. S. publications, but most of it deals strictly with Soviet work. Part 1, 146 pp. $30. Part 2, 268 pp. $20. Both for $40. Consultants Bureau, 227 W. 17th St., New York 11.

"Minerals: Canada & the World" (and 144-page supplement) is a graphic, statistical review of Canadian industries in relation to world producers. Metals, non-metals, and fuels are covered. 250 pp. $1 per copy (for "Minerals"). Dept. Mines & Tech. Surveys, Mineral Resources Div., Publications Branch, Ottawa, Canada.

"Aids to Efficient Machine Design in Welded Steel" assumes the reader feels welding can make his machines better. It then tells him how to weld to best advantage, redesigning from castings or designing from scratch. Layout is one designers can appreciate. Combined with a book on castings' advantages, this would make an excellent reference. 96 pp. $1 per copy. Lincoln Electric Co., 22801 Clair Ave., Cleveland 17, Ohio.

"1958 Book of ASTM Standards" consists of 10 parts. Part 2 is now ready on nonferrous metals. 1386 pp. 251 standards. $10 per copy. (Complete set of 10, when ready, $116). American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

"Diamond Dressing Tools" is a new American Standard (B67.1-1958) sponsored by ASTE and Industrial Diamond Assn. of America. $1 per copy. American Standards Assn., 70 E. 45th St., New York 17.

"Metals for Supersonic Aircraft & Missiles" has papers of 22 authors. 423 pp. $7.50 per copy. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

"Fundamentals of High Polymers" seems limited to readers who might use such materials as finishes or supplements to metals. 140 pp. $5.50 per copy. Reinhold Publishing Corp., 430 Park Ave., New York 22.

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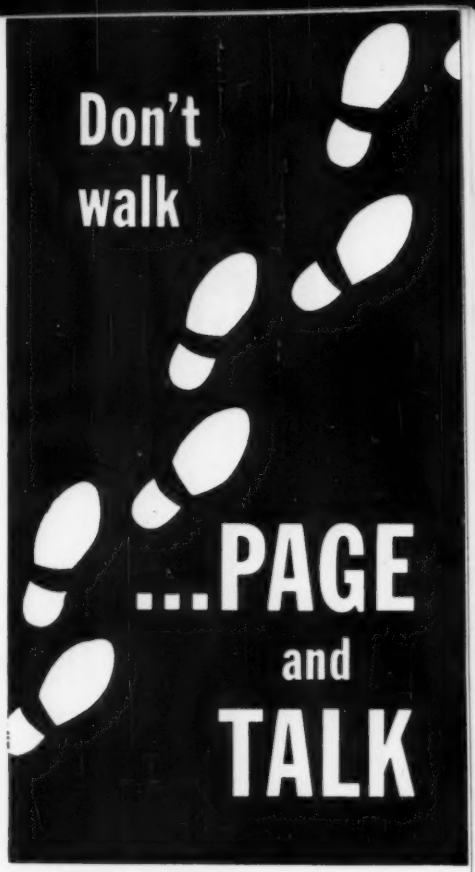

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The Iron Age Summary

Buyers Order for Third Quarter

Some steel users worry about their post-strike market position — if there is a strike.

So they're placing orders for third quarter to protect their delivery status.

■ Some steel users already are placing orders for third quarter delivery. These buyers realize the odds favor a steel strike in third quarter and want to be at the head of the line when it ends. If there is no strike, they figure they can cancel orders.

As one steel buyer puts it: "What's the good of having inventory during a strike if you're stuck for a month at the end of it."

Slow Inventory Buildup—At the same time, some steel buyers are having trouble building inventory as a strike hedge despite the record-breaking production pace of the mills.

(The mills last week turned out a record 2,562,000 tons of ingots, compared with the former high mark of 2,525,000 set in the week of Dec. 17, 1956. Output this week is scheduled at 2,604,000 net tons.)

"Our business is a lot better than we thought it would be," worries one metalworking executive. "As a result, our inventory is building up at a slower pace than we had hoped for."

For example: American Motors Corp. last month reviewed its production schedules, added 40,000 units to its March, April, May program. Result: Its steel usage has gone up from 12,000 tons per month a year ago to 32,000 tons per month today.

Record Order Intake—Another automaker has raised its 1959 production goal by 100,000 units. Its purchasing agents are now sparring with steel mills for an increase in allocations in line with stepped-up output.

A large mill reports last week's new orders set a two-year record. Its experience is probably typical of what is happening throughout the steel industry. Incoming tonnages are so heavy that the mills are having a hard time keeping things straight.

Fast Tempo Ahead—By April, the tempo in steel will be stronger than at any time in steel history.

Here's the situation:

(1) Demand is spreading to all products, including railroad steel and structurals.

(2) Steel order carryovers are mounting. What this means is that in some cases the mills are finding it impossible to deliver some orders in the month promised. As a result, some March business will spill over into April, April into May, and so on.

(3) These carryovers will tend to offset the effect of duplicate orders some buyers are placing with more than one mill. So the bottom isn't likely to drop out of the steel market should there be a peaceful settlement of steel labor contract demands.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,604	2,562	2,378	1,463
Ingot Index (1947-1949=100)	162.2	159.5	148.0	91.1
Operating Rates				
Chicago	95.0	93.0*	88.0	58.0
Pittsburgh	94.0	92.5*	80.0	54.0
Philadelphia	98.0	94.0*	90.0	56.0
Valley	96.0	96.0*	79.0	45.0
West	87.0	86.0	85.0	73.5
Cleveland	91.0	91.0*	83.0	37.0
Detroit	97.0	99.0	95.0	47.0
Buffalo	105.0	102.0	100.0	37.0
South Ohio River	94.0	95.0*	91.0	51.0
South	88.0	81.0	73.0	49.5
Upper Ohio River	93.0	95.0	83.0	77.5
St. Louis	82.0	89.0*	82.5	85.0
Aggregate	92.0	90.5	84.0	54.2

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	$66.41	$66.41	$66.41	$66.49
Scrap No. 1 hvy (Gross ton)	$41.17	$41.83	$43.83	$37.33
No. 2 bundles	$29.00	$30.00	$30.33	$28.50
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	28.10
Copper, electrolytic	31.50	30.00	30.00	25.00
Lead, St. Louis	11.30	10.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.00	104.00*	102.375	95.75
Zinc, E. St. Louis	11.00	11.00	11.50	10.00

Industrial Truck Orders Are Up

Market researchers predicted about 20 pct improvement in business this year.

So far it has been even better than that.

But good advance planning has kept the strain off the consumer.

▪ Things were black. Business for industrial truck makers was off sharply in 1958. And the capital spending plans for 1959 announced by industry didn't appear to offer much relief.

About the middle of the year the marketing research team of a major industrial truck maker (there were fewer in the group than there had been earlier in 1957) saw signs of improvement.

Called the Upturn, But — The more they probed the more they saw better times around the corner despite the empty pages in order books.

So, they hitched up their courage and told management to plan for about 20 pct better business in 1959.

If the level of orders set during the first two months of the year hold, the prediction of these market men will be notably conservative.

Buying Equipment—One of the reasons these market researchers figure they blew it on the light side was their appraisal of capital spending plans. "When things started to turn better almost everyone boosted their spending plans at least a little. Also, more companies are going to concentrate a bigger percentage of their capital dollar on equipment rather than actual bricks and mortar than is traditional."

Industrial truck makers have been scurrying around since the first of the year. But they have been successful keeping the pressure off customers. Competition is holding prices. And competition prevented industrial truck makers management from taking chances. When their market probers predict a 10 pct boost in business, they figure a reasonable spread either way. This time this cushion made the difference.

Right Away—For standard units delivery is practically immediate. There is a slightly longer line at the door to the engineering department waiting for plans for special machines. But there are more engineers inside.

Like most industries that managed to weather the recession storm without too much damage, industrial truck makers can find a silver lining.

Looking Trimmer — Says one company executive, "We got pretty fat during the boom of 1956-1957. We managed to pare most of this off. There were no real bad spots. We reduced all the way around. The union is a little unhappy because we are hiring back men at a slower rate. But our more efficient setup could make a lot of difference."

The main problem faced by the industrial truck makers today is their own raw material inventories. Heading the list of potential troublemakers is steel. One major truck maker figures he will have to have at least a three-month supply of steel laid in before July 1 strike deadline. So far the industry appears to be getting the steel for inventory they want.

Price Follows Steel—Of course if steelmakers raise their prices, so will industrial truck makers, about the same amount.

LIFT TRUCKS: Business has really started to boom for industrial truck makers. But so far good advance planning has enabled them to meet demand at going prices, with little delay in shipments. Standard items, like this Yale & Towne truck designed for narrow aisles are still available right away.

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*Based on projections made from A.I.S.I. 16 Report.

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What Share of Buying Is Strike Hedge?

Even without the threat of a steel strike the market would be improving.

And some tonnages marked for the stockpile are needed for production now.

▪ How much of the current buying boom represents strike hedging and how much increased need for steel?

Estimates by the steelmakers themselves vary. But this much is clear: Even without the threat of a strike steel buying would be healthy.

"We're operating at close to 100 pct," says a spokesman for a plate producer. "Without inventory building our level would be about 80 pct." Another steelmaker believes 25 pct of present buying is for inventory. A third assigns 10 pct of the operating rate to strike hedging.

Some of the "excess" in steel orders — first earmarked for the stockpile—is clearly going into current production. Detroit area steel users are asking for shipment of part of their April tonnage this month. And they want part of May orders shipped next month.

It's clear auto steel buying, for stock or use, is a key factor in the market. Here's why: Last year the automakers turned out 4.8 million cars while their steel inventories averaged 15 days. Now they are trying to build a 60-day steel supply for a higher production level.

Both the speed and size of the buildup causes concern. Other steel buyers, seeing a chance for better-than-expected auto sales, are worried that the automakers will be out of sheet by the end of May. Steel mills, however, wonder if a slide in auto sales would result in a rash of order cutbacks.

Sheet and Strip—Some mills are now booking July tonnages of sheet and strip. Delivery cannot be guaranteed because of the prospect of a steel strike. But users want to get the orders on the books if possible. Sheet mill backlogs on second quarter tonnages are running as high as 6 weeks for **Chicago** area mills. They include hot- and cold-rolled sheet, galvanized sheet, terneplate, and even some electrical sheet. Strip mills there are in better shape. But they are booked to capacity and order delinquencies are expected.

Plate — Sheared mill plate remains in strong demand with most mills on a limited acceptance of orders. An **Eastern** mill lists sheared mill plate as booked through May. The same mill says April books are filling fast for universal mill plate. And only "limited tonnages" of strip mill plate are available.

Farther west the supply situation is more critical. Brokers in the **Chicago** area are quoting premium prices—in some cases $5 a ton higher.

PURCHASING AGENT'S CHECKLIST

How Westinghouse plans its steel buying. **P. 83**

Tinplate demand has bolstered tin market. **P. 89**

How to get more from your data processing system. **P. 121**

Structurals—Renewed freight car building programs are helping boost demand for standard shapes. Other fabricators are finally beginning to build stocks, although their own order books are slim. Despite this improvement **Pittsburgh** and **East Coast** mills still had March tonnage available one week into the month. At **Chicago** mills, however, structurals are a quota item. Buyers there are bombarding mills for fast delivery.

Pipe and Tubing — Oil country seamless remains one of the stronger products. A large **East Coast** supplier says it's on an informal allotment basis for the second quarter. Linepipe is also staging a comeback, but ordering still is not in the long-terms of recent years. One producer says, "Small orders—for about a mile or two of pipe in 10 to 20 in. sizes—can be shipped from stock."

Standard pipe jobbers have finally started to re-build stocks. Despite this mills can still make fast delivery.

Capacity Boost for J&L—Jones & Laughlin Steel Corp. has announced plans to increase open-hearth capacity at its Pittsburgh Works. Initial phase of the program will step up monthly output of its No. 4 Shop by about 15,000 tons above the present capacity of 195,000 tons. This will be done by increasing the average size of furnace heats from about 280 tons to 310 tons and by purchasing new and larger steel ladles.

Fasteners — The unwieldly discount method of computing fastener prices may be in for a sweeping revision. There are reports manufacturers are considering other pricing arrangements. Meanwhile fastener sales are improving rapidly. Stock items for industrial use are now on 6-week delivery, up two weeks since a month ago. Auto and appliance users are important in the upturn, but it's really an across-the-board surge. One **Cleveland** area producer recently had the best month since 1955.

COMPARISON OF PRICES

(Effective March 10, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Mar. 10 1959	Mar. 3 1959	Feb. 10 1959	Mar. 11 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloy blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

	March 10 1959	March 3 1959	Feb. 10 1959	March 11 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$44.50*	$45.50	$47.50	$37.50
No. 1 steel, Phila. area	*37.50*	38.50	39.50	38.00
No. 1 steel, Chicago	41.50	41.50	44.50	36.50
No. 1 bundles, Detroit	*37.50*	38.50	40.50	32.50
Low phos., Youngstown	*47.50*	48.50	49.50	38.50
No. 1 mach'y cast, Pittsburgh	51.50	51.50	51.50	51.50
No. 1 mach'y cast, Phila.	49.50	49.50**	49.50**	49.50
No. 1 mach'y cast, Chicago	56.50	56.50	57.50	48.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$41.17*	$41.83	$43.83	$37.33
No. 2 bundles	*29.00*	30.00	30.33	28.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50-15.50	$14.50-15.50	$14.50-15.50	$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	30.00	30.00	25.00
Copper, Lake, Conn.	31.50	30.00	30.00	25.00
Tin, Straits, N. Y.	*102.00*†	104.00*	102.375	95.75
Zinc, East St. Louis	11.00	11.00	11.50	10.00
Lead, St. Louis	11.30	10.80	11.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	23.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised. ** Corrected.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Uncertainty Grows As Prices Drop

Steel mills are booming along at near-record levels, but they're not buying scrap.

The situation is undermining dealer confidence in many districts.

■ How much longer can the mills operate at near-capacity without buying scrap?

There are a growing number of pessimists in the dealer market who answer, "Indefinitely."

For the third week running, the ingot rate has been above 90 pct and no large scrap orders are in the wind. There is mounting opinion in the trade that time is running out.

Soon the mills will have passed the point where they will need dealer scrap to meet steel-strike hedge-buying demand, the pessimists believe. They see mill scrap inventories in healthy condition, blast furnaces operating at capacity, and industrial lists supplying what additional scrap is needed in the openhearths.

Still, there is a hard core of optimists who answer the question, "Not much longer." With the operating rate continuing to advance, it is a good idea to hang on to fairly strong scrap reserves, the optimists say.

In the highly sensitive Chicago market, for instance, some brokers are reported buying up material with an eye to price advances in April. Any tonnage orders could produce an abrupt market rebound.

Generally, the scrap market is more uncertain today than it has been in many months.

Limited sales of No. 1 heavy melting in Pittsburgh and Philadelphia at lower prices sent The IRON AGE Composite Price down 66¢ to $41.17.

Pittsburgh—Two mill purchases within a week's time moved prices down, then up. Last week, one mill bought No. 1 heavy melting at $44, No. 2 heavy melting at $37, and No. 2 bundles at $31. A few days later, a second mill bought No. 1 heavy melting at $45 and No. 2 bundles at $32. The later price established the current market price. It also created a situation where, for the first time in a number of months, unfilled orders from two major mills had been thrown on the market.

Chicago — Prices firmed somewhat, though trading continued dull. No. 2 grades dried up considerably following the recent market break, and this condition is spreading to other grades. General reaction seems to be that with mill operating rates continuing to advance, it's a good idea to hang on to fairly strong scrap reserves at the yard level.

Philadelphia — Prices of openhearth scrap slipped another $1 this week on basis of limited weekly quota accepted by one mill. Price of No. 1 dealer bundles is unchanged. Pessimism is growing in the trade as mills continue to rely on industrial scrap and hot metal.

New York—Despite dealer protests, prices for steelmaking grades fell $1 to a top of $30 for No. 1 heavy melting. Cast and turnings grades continued at going prices.

Detroit — Dealers are worried over high ingot production and no demand for scrap. Prices for steelmaking grades are down $1 to $3. The few purchases made by local mills have been small. Average price for No. 1 industrial bundles was incorrectly quoted at $36 last week. It should have been $46.

Cleveland—The market here and in the Valley weakened another $1 after a Valley mill bought No. 1 dealer grades for $46 and the order was filled in one day. Two-ft cut structural and plate went for $47 in Cleveland, a startling $4 drop from previous quotas.

St. Louis — Heavy scrap supply and weak mill demand sent prices down $1 to $2 in this market. Only exception is stove plate, up $1.50 to $44-45.

Birmingham—Although brokers are wary about changing quotations on items not being bought, the market in this district is weaker. A large electric furnace mill returned to the market and quickly filled its needs for March.

Cincinnati—Market is off another $1 as local orders are filled quickly. Mills are taking only original offerings and no more.

Buffalo—Steelmaking grades dropped $2 on basis of purchases by a local mill. All other items on the list are down from $1 to $3, with exception of cast grades.

Boston — The market continues dull. Prices are barely holding steady.

West Coast—Good-sized export orders have firmed the market at a higher level. Steelmaking grades are up $1 to $2. Local mills are taking only limited tonnage.

Houston—Prices of No. 1 and No. 2 heavy melting are up $3 on district mill's purchase for March requirements. Although market showed some strength, most brokers are adopting a "wait and see" attitude regarding the market's future. Exporters foresee increased activity.

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		T	F
1	A supervisor has a right to expect his subordinates to accept him as their natural leader.	( )	( )
2	You can always tell if a man is loyal by the way he talks and acts.	( )	( )
3	The best way to change a man's attitude about an issue is to show him the facts.	( )	( )
4	You can be sure that any improvement in working conditions will be appreciated by subordinates.	( )	( )
5	Being tolerant and sympathetic with workers assures your getting their full cooperation.	( )	( )

(answers below)

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SCRAP PRICES *(Effective March 10, 1959)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. punch'gs plate	51.00 to 52.00
Heavy turnings	37.00 to 38.00
No. 1 RR hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	225.00 to 230.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	125.00 to 130.00
410 turnings	50.00 to 60.00

Chicago

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	42.00 to 43.00
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	53.00 to 54.00
Low phos. punch'gs plate, ¼ in. and heavier	50.00 to 51.00
Low phos. 2 ft and under	48.00 to 49.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	51.00 to 52.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	59.00 to 60.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	71.00 to 72.00
RR couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	49.00 to 50.00
Cast iron wheels	44.00 to 45.00
Malleable	56.00 to 57.00
Stove plate	46.00 to 47.00
Steel car wheels	51.00 to 52.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	24.00 to 26.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	21.00 to 22.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	25.00 to 26.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	41.00 to 42.00
Heavy turnings	35.00 to 36.00
RR specialties	45.00 to 46.00
Rails 18 in. and under	59.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	32.50 to 33.50
No. 1 dealer bundles	37.50 to 38.50
No. 2 bundles	24.00 to 25.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	19.00 to 20.00
Low phos. 18 in. and under	46.00 to 47.00
Rails, random length	49.00 to 50.00
Rails, 18 in. and under	56.00 to 57.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	48.00 to 49.00

Youngstown

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Low phos. plate	47.00 to 48.00

Cleveland

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	41.50 to 42.50
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	26.50 to 27.50
No. 1 busheling	41.50 to 42.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut structural & plates, 2 ft & under	46.00 to 47.00
Drop forge flashings	41.50 to 42.50
Low phos. punch'gs plate	42.50 to 43.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails 2 ft and under	58.00 to 59.00
Rails 18 in. and under	59.00 to 60.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	66.00 to 67.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles	110.00 to 120.00

Buffalo

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 busheling	39.00 to 40.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	48.00 to 49.00
Rails 2 ft and under	58.00 to 59.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	20.50 to 21.50
Cast iron borings	22.00 to 23.00
No. 1 RR hvy. melting	42.00 to 43.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	53.00 to 54.00
Angles and splice bars	49.00 to 50.00
RR specialties	45.00 to 46.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	44.00 to 45.00
Cast iron car wheels	44.00 to 45.00
Rerolling rails	59.00 to 60.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	37.00 to 38.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	42.00 to 43.00
Structural and plate, 2 ft.	41.00 to 42.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	43.00 to 44.00
Rails, 18 in. and under	51.00 to 52.00
Angles and splice bars	44.00 to 45.00
Rerolling rails	55.00 to 56.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Clean chem. cast. borings	23.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	35.00 to 36.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast.	35.00 to 36.00
Mixed cupola cast.	42.00 to 43.00
Automotive cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	$32.00 to 34.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	44.00 to 45.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	21.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	44.00 to 45.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

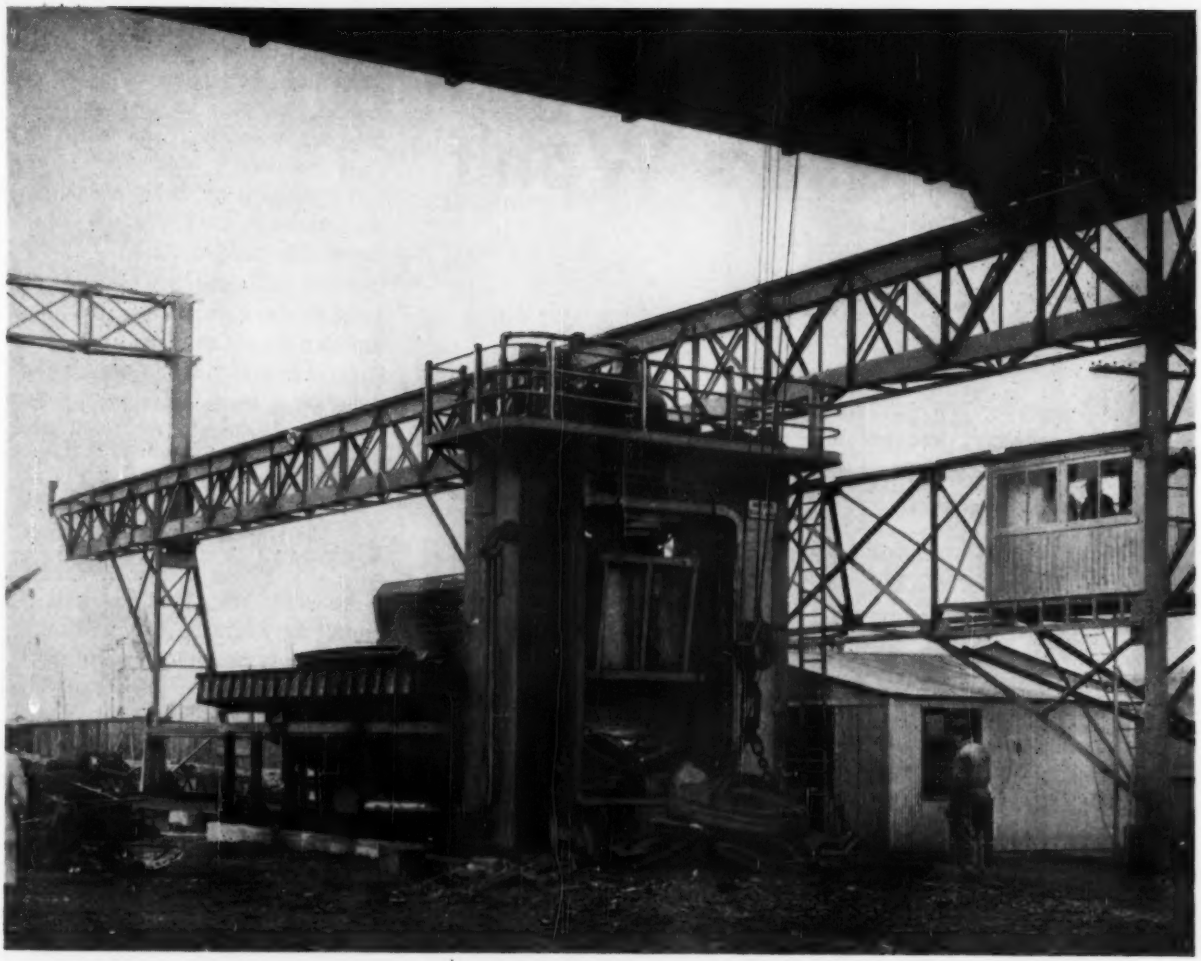
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.50
No. 2 hvy. melting	30.50
No. 1 dealer bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Bush., new fact., prep'd	34.50
Bush., new fact., unprep'd	28.50
Machine shop turn.	13.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 2 bundles	23.00
Machine shop turn.	15.00
Shoveling turnings	19.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks	32.00 to 33.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	30.00 to 31.00



NEW 750-TON SCRAP SHEAR

proves its productivity in service

Scrap preparation has been placed on a highly mechanized plane at Schiavone-Bonomo Corporation, New Jersey, with the installation of a new Farrel Watson-Stillman hydraulic shear.

This 750-ton* machine, which is arranged for manual and semi-automatic operation, combines high output with economy of operation. It will handle 200 tons of industrial scrap in an eight-hour day, with only three men needed for the job—one to run the shear, another to operate a crane and a third to watch for derelict material in loading. Thus, labor cost can be cut as much as 75%.

New bulletin 390 gives design details and specifications. Send for a *free* copy today.

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*350 and 900-ton shears are also available.

WS-58

Copper Users Won't Stop Buying

The U. S. market has hit a point where price isn't the big factor in buying decisions.

It looks like no one is willing to take a chance on the supply this summer.

▪ The U. S. copper market is turning into a merry-go-round.

There are no leaders, no followers—just a crowd of buyers each afraid to get off.

And things are likely to stay that way until the murky labor situation of U. S. miners and smelters clears. The deadline is June 30 when contracts between companies and most unions expire.

Producers Prices Raised — On Monday, U. S. producers did the expected and raised their prices by 1½¢ per lb to 31½¢. Before the higher price was even 48 hours old many observers were warning not to look for any slackening of buying. Most were sure custom smelters would continue to do good business at price premiums — a sure sign spot demand tops supply. And the higher prices are likely to draw little foreign copper from strong European markets.

If this pressure stays on all the way into June it is likely to drive prices still higher along the way.

The big variables in the current situation are (1) Chances for major strikes at U. S. installations this summer, and (2) Level of real future demand. The longer the situation stays muddy, the more complicated it gets.

Here's the latest picture:

Strikes—Without any additional facts, more copper buyers now appear to believe there will be at least some major work stoppages this summer. The rash of small but effective work stoppages cropping up lately seems to be getting to jittery buyers.

One thing that can't be passed off to jitters—even if there is no major strike this summer, the copper lost in these brief, one-plant stoppages can add up. And these are likely to continue.

For one thing, the copper companies deal with many unions. One company figures it bargains with 31. Most unions will not cross the picket line of another, so a few men can tie up an entire plant.

. . . Cause no Panic—On the bright side, one copper man points out this is the history of his industry, so management knows how to handle the problems with a minimum of lost time.

Example: A jurisdictional dispute, over whether members of one or another union should perform a specific task on the railroad that carries ore from mines to Anaconda's Butte smelter caused only one day's work loss before the company had an injunction from the Ninth Circuit Court in San Francisco ordering the men back to work until the problem is solved.

Level of Demand—More copper purchasing agents are starting to lose sleep over real consumption than over strike possibilities. They know they are buying some copper just in case supplies dry up. Now they are wondering how much of their customer's orders for fabricated products are being placed for the same reason. They would rather know this than anything.

Some bulls say real demand is good. But more important, they say the rate at which it is improving is excellent. Those who predict the industry is going to come out of 1959 pretty much unscathed are usually counting on this.

Copper

Rules or not, U. S. copper is finding its way to Russia. How:? The "switch business system," says Max Teisch, vice president of A. Strauss and Co., Inc., New York.

English dealers buy U. S. scrap copper, and then shuffle it right along to Russia for the price of electrolytic copper. Mr. Teisch told the Philadelphia Metals Assn. at its last meeting, "Russia evidently cares little about price and is willing to pay almost anything to get the copper she needs for her industry."

Mr. Teisch also pointed out that

Primary Prices

cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	31.50	30.00	3,9/59
Copper (CS)	32.00	31.50	3 4/59
Copper (L)	31.50	30.00	3/9/59
Lead, St. L.	11.30	10.80	3,5/59
Lead, N. Y.	11.50	11.00	3/5/59
Magnesium ingot	36.00	34.00	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	182-182	185-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/25/59
Zinc, N. Y.	11.50	12.00	2/25/59

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. Tin: See right; Other primary prices, pg. 182.

the switch business system wasn't causing much damage since exports in 1958 were only about 52,000 tons, or 7.75 pct of what was recovered domestically.

Aluminum

The first annual report from an aluminum producer is in, with few if any surprises. Kaiser Aluminum & Chemical Co. reports 1958 sales were up, while profit was down.

Total of 490,187 tons of aluminum products brought in over $408.5 million. In 1957, 479,221 tons of products sold made the company $391.6 million.

But last year, net income was $25.2 million, or $1.43 per share; and in 1957 it was $26.8 million, or $1.58 per share.

Mum's the Word—The company had very little to say about its international division. This arm was set up in 1957, and many believe it is now coming in for a bigger share of attention.

Kaiser's market research people crawled out on a small limb and predicted shipments, by industry, for 1965. Here's what they say:

Industry	1965 Forecast	1958
Building	1557	757
Electrical	1446	468
Transportation	1302	356
Consumer Durables	856	349
Packaging	451	227
Mach. & Equip.	384	194
Destructive	225	137
Other	1681	644
Total Commercial	7902	3132
Defense	500	468
Total Industry (millions of lb)	8402	3600

Tin prices for the week: March 4 — 103.50; March 5 — 103.00; March 6—102.00; March 9—101.875; March 10—102.00.*

*Estimate.

HOW TO BEAT THE HEAT

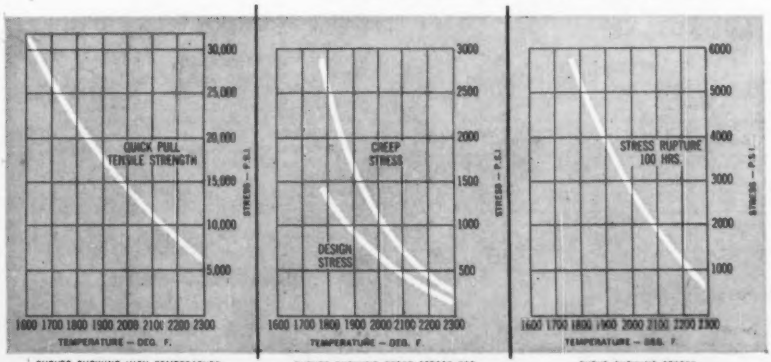
for strong high alloy requirements in the 1,800° to 2,300° F range!

DURALOY HOM*

*Covered by U.S. Patents

casting alloy

Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM

CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM

CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

The DURALOY Company
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ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3.
1100, 3003	45.7	43.8	42.8	43.3
5052	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	⅞-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.63	.....	52.86	55.82
Brass, Yellow	48.24	48.75	48.18	51.65
Brass, Low	51.23	51.77	51.17	54.54
Brass, R L	52.29	52.83	52.23	55.60
Brass, Naval	52.80	.....	46.61	56.21
Muntz Metal	50.85	.....	46.16	.....
Comm. Bz.	53.90	54.44	53.84	56.96
Mang. Bz	56.54	.....	50.14	.....
Phos. Bz. 5%	75.34	.....	75.84	.....

Free Cutting Brass Rod 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, $6.90-$7.40; alloy, $14.35; Plate, HR, commercially pure, $5.00-$5.75; alloy, $7.75-$8.50. Wire, rolled and/or drawn, commercially pure, $5.50-$6.00; alloy, $8.00-$9.50; Bar, HR or forged, commercially pure, $4.25-$4.65; alloy, $4.25-$7.15; billets, HR, commercially pure, $3.55-$4.10; alloy, $3.55-$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.45
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 35.00 to 42.00
Gold, U. S. Treas., per troy oz.... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $218 to $221
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $16 to $18
Platinum, dollars per troy oz... $77 to $80
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 30.75
No. 120 ..... 29.75
No. 123 ..... 28.75
80-10-10 ingot
No. 305 ..... 35.00
No. 315 ..... 33.00
88-10-2 ingot
No. 210 ..... 43.50
No. 215 ..... 39.25
No. 245 ..... 35.00
Yellow ingot
No. 405 ..... 25.00
Manganese bronze
No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.75-25.00
0.60 copper max. 24.50-24.75
Piston alloys (No. 122 type).. 24.25-25.25
No. 12 alum. (No. 2 grade).... 21.50-22.00
108 alloy 22.00-22.50
195 alloy 25.00-26.00
13 alloy (0.60 copper max.)... 24.25-24.75
AXS-679 (1 pct zinc) 21.75-22.25

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.50-23.50
Grade 2—92-95% 21.25-22.25
Grade 3—90-92% 20.25-21.25
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27½	26¾
Yellow brass	20⅝	18¾
Red brass	24⅛	23½
Comm. bronze	25⅛	24⅜
Mang. bronze	19⅛	18⅜
Free cutting rod ends.	20½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 28¼
No. 2 copper wire 26¾
Light copper 24½
*Refinery brass 26¼
Copper bearing material 25¾
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 28¼
No. 2 copper wire 26¾
Light copper 24½
No. 1 composition 23
No. 1 comp turnings 22½
Hvy. yellow brass solids 16½
Brass pipe 17¾
Radiators 18

Aluminum

Mixed old cast. ..... 12 —13
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 25½—26
No. 2 copper wire ..... 23½—24
Light copper ..... 21½—22
Auto radiators (unsweated). 15 —15½
No. 1 composition ..... 19 —19½
No. 1 composition turnings.. 18 —18½
Cocks and faucets ..... 15½—16
Clean heavy yellow brass ... 13¾—14¼
Brass pipe ..... 15½—16
New soft brass clippings .... 16¼—16¾
No. 1 brass rod turnings .... 13½—14

Aluminum

Alum. pistons and struts .... 6 — 6½
Aluminum crankcases ..... 9½—10
1100 (2s) aluminum clippings 13 —13½
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 6 — 6½
Industrial castings ..... 9½—10
2020 (24S) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 4¾— 5¼
Old zinc ..... 3¼— 3½
Zinc routings ..... 2 — 2¼
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 37-40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 30-32
Clean Monel turnings 30-32
Old sheet Monel 26-28
Nickel Silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 6½— 6¾
Battery plates (dry) ..... 2 — 2¼
Batteries, acid free ..... 1¾— 2

Miscellaneous

Block tin ..... 77 —78
No. 1 pewter ..... 59 —60
Auto babbitt ..... 40 —41
Mixer common babbitt ..... 9½—10
Solder joints ..... 13¼—13¾
Siphon tops 42
Small foundry type ..... 9½—10
Monotype ..... 9½—10
Lino. and stereotype ..... 8½— 9
Electrotype ..... 7 — 7½
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

(Effective March 9, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3, R3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *F3*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$113.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective March 9, 1959)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A1*	6.275 *A1*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*	6.875 *G2*							$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *W5, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective March 9, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.475 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*	5.675 *U1,13, Y1*	7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, 11*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	8.625 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				8.675 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6*	6.425 *B2*				8.675 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective March 9, 1959) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter-Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B.. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ in.		¾ in.		1 in.		1¼ in.		1½ in.		2 in.		2½–3 in.		2 in.		2½ in.		3 in.		3½–4 in.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50								
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50								
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50								
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50								
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Fontana *K1*	+6.25		+2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50								
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	6.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50								
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective March 9, 1959)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *P5*	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.50 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective March 9, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***	177	190	172	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	...	9.95	10.50†
SparrowsPt. *B3***	175	.....	...	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube	2	13	40.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1⅛" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
C. P. Hex, reg. & hvy.	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	41
Semi-finished Hex Nuts	
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 65

Rivets	*Base per 100 lb*
½ in. and larger	$12.85
	Pct. Off List
7/16 in. and smaller	15

Cap Screws	*Discount (Packages)*
	Full Finished H. C. Heat Treat
New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54	42
¾", ⅞", and 1" diam. x 6" and shorter	38	23
⅝" diam. and smaller x longer than 6"	..	..
¾", ⅞", and 1" diam. x longer than 6"	..	..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

	Quantity	Discount Mach. Screws	Discount Stove Bolts
Plain Finish Cartons		60	60
Bulk			
To ¼" diam. incl.	25,000-and over	60	..
5/16 to ½" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Discount Square
In Cartons		16	19
In Bulk			
⅝" diam. & smaller	25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	45.00
Electrodeposited	36.00
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 8 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*	.....	.....	.....	.....
Baltimore	$.10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99	.....	.....	.....	.....	.....
Boston	.10	9.41	10.50	12.07	9.84	10.12	10.11	10.21	13.45*	16.79	15.79	20.29	19.56
Buffalo	.15	8.40	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	.15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	.15	8.58	9.65	10.70	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	.15	8.51	9.69	11.51	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit	.15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60	.....	8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70[6]	11.20-11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11*	.....	.....	.....	.....
Milwaukee	.15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.09
New York	.10	9.27	10.59	11.20	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.44	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	.15	8.50-8.60	9.70-9.95	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	11.50[5]	11.10[5]	9.85[7]	15.30*	18.50	17.45	20.75	20.25
San Francisco	.10	9.75	11.20	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		9.95	11.55	12.45	10.00	9.70	9.80	10.10	14.70	17.15	16.80	20.65	20.60
Spokane	.15	10.10	11.70	12.60	10.65	9.85	9.95	10.75	14.85	17.75	16.95	21.55	20.75
St. Louis	.15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	.15	8.94	10.19	11.64	8.99	9.45	9.53	9.70[7]	10.16	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] 4⅛" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999; [8] 15 ga. & heavier.

(Effective March 9, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $103.50; (15.51–16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R5*; Gary, *U1*, (25¢ per lb. higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*.

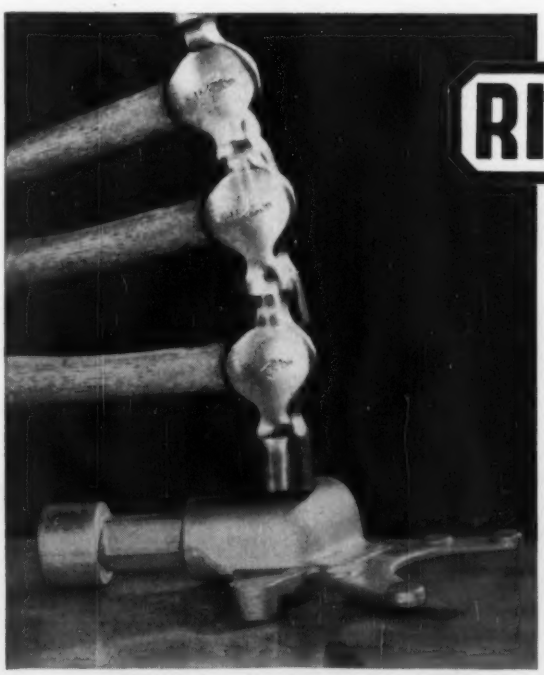
Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *I4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*.

(Effective March 9, 1959)



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Toughness to shock and stress is just one of the many features found in Ritco Forgings. While their dense, fibrous structure and controlled grain flow assure maximum impact resistance and fatigue strength, their smooth, highly accurate surfaces speed up assembly time, save hours of time and trouble. Made to close tolerance specifications, these finer forgings enable you to hold machining to a minimum . . . keep production costs down.

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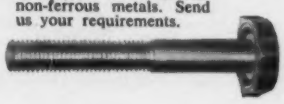

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RHODE ISLAND TOOL COMPANY

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144 WEST RIVER STREET • PROVIDENCE 1, R. I.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
8% max C, 50-55% Cr, 6% max Si. 25.75
4½% max C, 50-55% Cr, 2% max Si 26.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$109.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 3000 lb up to carloads	16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	24.95	23.65
98% Si, 1.0% Fe	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
		90% Si....	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.

Ton lots	$3.90
Less ton lots.....	3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

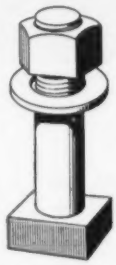
No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

(Effective March 9, 1959)



WESPO

T-BOLTS & BOLSTER BOLTS

ALLOY STEEL 150,000 LBS. TENSILE STRENGTH

T-Bolts-½", ⅝", ¾", ⅞", 1" Body Diameters

Bolster Bolts to J.I.C. Standards

Special bolts available to 1½" body diameter and 3" Square Head. All bolts except ½" and ⅝" available with Hexagon Heads . . . Hardened Nuts and Ground Washers available for all size bolts.

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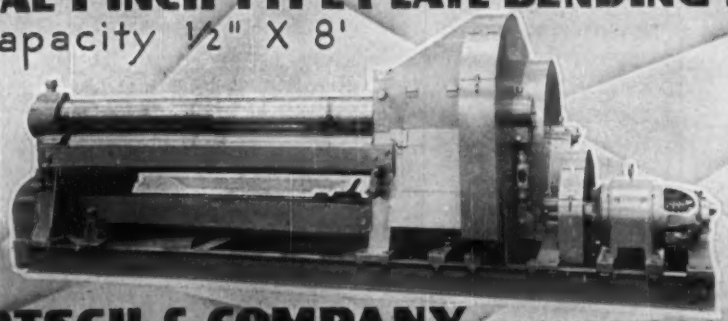

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New 1948

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MOTOR GENERATOR SETS

Qu.	K.W.	Make	R.P.M.	Volts D.C.	Volts A.C.
3*	3500	Al.Ch.	514	350/700	13,800/6900 4160
1	2000	G.E.	450	132/265	4160/2400
2*	2000	Whse.	720	600	13,800/6900 4160
2	1250	Whse.	720	600	4160/2400
1	1250	G.E.	450	250	4160/2400
2	1000	Whse.	720	600	4160/2400
2	500	Whse.	1200	125/250	4000/2300
1	450	Whse.	900	280/300	2300
3	300	Whse.	1200	125/250	4000/2300
1*	300	Al.Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
1	150	Whse.	1200	250	2300
1	150	G.E.	1200	250	4600/2300
2	150	Rel.	1200	125	2300

*—3 Unit Sets

SPECIAL, before removal (1) 1875-K.W. Whse., M.G. Set, Gen. 250-V.D.C., 514 R.P.M. with 2700-H.P. Syn. Motor, 13800/6900/4000-V., 3 ph., 60 cy. with Control.

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	3000	G.E.	M.P.C.	300/600	250/360
3***	3000	Whse.	Rev.	525/600	600
1**	2200	Whse.	Mill	600	92/132
8**	1500	Whse.	Rev.	525	600
1**	1250	Al.Ch.	Mill	600	300/600
2**	940	S.S.	Mill	600	300/1600
1**	700	Whse.	Mill	600	143
1**	700	Whse.	Rev.	250	300/700
2**	645	S.S.	Mill	300	1000
1	600	Whse.	Mill	250	110/220
2	600	Al.Ch.	Mill	600	300/600
1	400	G.E.	M.P.C.	270	450
1	300	Whse.	Mill	230	300
2	275	Whse.	Q.M.660.6	250	425/850
1	175	G.E.	C.D.175-A	245	800/1025
1	125	Whse.	SK-184	230	575/850
1	125	Whse.	SK-190	230	450/1000
1	100	Rel.	401-T	230	1150/1500
1	100	Whse.	SK-183	230	450/1000
1	100	G.E.	CD-175	230	400/1200
1	80	Rel.	451-T	230	575/1150
1	80	El.Dy.	25-S	230	525/1050
1	50/60	Whse.	SK-131	230	500/1500
1*	50	G.E.	CD-175	230	400/1200
2*	30/40	Whse.	SK-131	230	500/1500

*—T.E.F.C. **—Enclosed Forced Ventilated
***—Two Motors in Tandem.

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Spending Veto Blocks New York Sales

Used machinery sellers there say buyer reluctance to spend hampers activity.

But they are confident improving industrial climate will shake more orders loose.

■ Cash conservation is still a roadblock to higher sales for used and rebuilt machinery in the New York area. Dealers report substantial business pending when customers' front offices give the okay to spend the money. A few buyers cut loose the pursestrings in recent weeks, but so far they remain a minority. Generally, prospective buyers are waiting to make sure of the business upturn.

Hardest Hit—While this problem is widespread throughout the New York market, it appears particularly acute for electrical machinery and equipment. A leading dealer reports he has several hefty orders for rolling mill drive and control equipment. But he is still waiting for mill management to approve the expenditures. For other kinds of machinery, contract awards are now a major spur to new tool buying.

A dealer specializing in construction and ironworking equipment says his business is perking up as warmer weather spurs construction. He adds missile contracts are becoming a major factor as orders for launching platforms are placed.

Price Barriers — Another dealer maintains, "Everything is good if it's cheap enough." Price resistance is widespread, and customers are openly shopping around. One dealer says he lost a sale for a $50 price difference. Inquiries are generally brisk, but price comes up very early in the conversation.

Tool room equipment, a staple in the New York market, continues a good seller, with some dealers reporting a pick-up in recent weeks. There is renewed interest in production machinery like turret lathes, grinders, and presses, especially in medium to heavy capacity lines. But here also the market is very competitive, with price a major consideration.

Sound Optimism — Despite the delays and competitive nature of today's market, dealers are more optimistic than they have been for some time. They point to overall industrial improvement, reactivation of deferred expansion plans and growing realization of the high cost of present obsolete equipment as cheering factors.

January Sales Drop

Nationwide sales of used machinery declined in January, according to latest reports from the Machinery Dealers National Assn.

Dollar sales for the month, says the MDNA, were 19 pct below December, 1958 levels. They were also 9.5 pct below January, 1958.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10 Ga. Bertsch No. 6 Initial Type
12 x ⅜" Hilles & Jones Pyramid Type
32' x ¾" BALDWIN PYRAMID TYPE—LATE

BRAKE—LEAF TYPE
12' x ⅛" Dreis & Krump

BRAKES—PRESS TYPE
800 ton Southwark 18' x ¾" Hydraulic
500 ton Pacific 12' Bending Length, Hydraulic

CRANES—OVERHEAD ELECTRIC TRAVELING

8 ton P&H	55' Span	230/3/60
10 ton P&H	39' Span	230 Volt D.C.
10 ton Milwaukee	57' Span	230 Volt D.C.
10 ton Shaw	48' Span	230 Volt D.C.
10 ton Whiting	75' Span	220/3/60 A.C.
10 ton Shaw	120' Span	230 Volt D.C.
15 ton N-B-P	100' Span	220/3/60 A.C.
30 ton Shaw	70' Span	230 Volt D.C.
120 ton Niles	67' Span	230 Volt D.C.

DRAW BENCHES
7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FORGING MACHINES
1" to 5" Acme, Ajax, National

GEAR REDUCERS
3000 H. P. United (2), Ratio 16.3-1 & 11.6-1

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.

LEVELERS—ROLLER
12" Waterbury Farrel 9 Rolls 6" Dia.
24" McKay 17 Rolls 3⅜ Dia.
50" Processor & Leveler, Capacity 50" x .100"
66" Guide 17 Rolls 4½" Dia.
72" Leveler 17 Rolls 2⅝"

MOTOR
800 H.P. Westinghouse 2200/3/60 505 RPM

MULTI SLIDE MACHINE
No. 35 U.S. Multi-Slide, Max. Capy. 4¼" wide x .089

NIBBLER
Pullmax Model 2, Capacity 11/32"

PRESS—EMBOSSING & COINING
#664 Toledo 600 ton, 2" Stroke

PRESSES—HYDRAULIC
300 ton Southwark, Bed 28" x 28", Stroke 25"
500 ton Watson Stillman Piercing Press, 48" x 72"
500 ton HPM Fastraverse, Bed 36" x 36"
600 ton Birdsboro, Platen 48 x 48", Stroke 15"
1000 ton Southwark, Bed 44" x 54", Stroke 20"
4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESSES—STRAIGHT SIDE
190 ton Toledo #57½, Bed Area 29x29", Stroke 10"
215 ton Clearing, Bed Area 36x42", Stroke 24"
260 ton Cleveland #7F, Bed 42 x 84", Stroke 12"
500 ton Hamilton #1810¼, Area 19x17⅛", Stroke 1⅛"
900 ton Hamilton 4E-1809, Bed 101x181", Stroke 36"

PUMP
250 GPM Aldrich Vertical, Triplex 4¾x9", 1500# Pressure, with 250 H. P. Motor 2300/3/60

PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
EF Cleveland, 60" Throat

ROLLING MILLS
3¼" x 7" Six Roll Cluster Mill
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Two Stand Two High
20" x 36" Single Stand Two High
26" x 60" Single Stand Two High

ROLLS—FORMING
6 Stand Dahlstrom #450-6 for stock to 4¼" wide
13 Stand Yoder M-2½, 30" Roll Space
18 Stand Custom Built, 2⅛ Shaft, will take 36" wide

SHEARS—SQUARING
6" x 14 Ga. Edwards, Motor Drive—LATE
10' x 10 Ga. Wysong & Miles
10' x ½" Bertsch
12' x 3/16" Cincinnati #1412

SLITTER
24" Torrington Slitting Line, 3½" Arbor

STRAIGHTENERS
Torrington #1734 12-Roll, Capy. 1¾", Rd. 1-9/16"
⅝" Shuster Straightener, 12 Ft. Cut-off

SWAGING MACHINES
#4 Torrington 2-Die, Capy. 2" Tube, ⅝" Solid
#6A Fenn, Capy. 3¾" Tube, 1⅛" Solid, 10" Die Length, With Hydraulic Feed

TESTING MACHINES
20,000 lb. Baldwin Univ. Hydraulic
60,000 lb. Southwark-Emery Universal Hydraulic
100,000 lb. Olsen Universal Hydraulic
100,000 lb. Olsen Universal Beam Type
500,000 lb. Olsen, Super DeLuxe Compression

THREAD ROLLER
#60 Waterbury Farrel, Max. thread dia. 1"

TUBE REDUCERS
1¼" Tube Reducer for steel
2½" Tube Reducer for steel

WIRE DRAWING MACHINES
Type B Morgan 4-Block Capy. #5 Rod down
Scudder 3-Block 20 Dia.
Superior 7-Draft Cone Type, Capy. 14 Ga. down
Vaughn 5 Block, Ea. block M.D. Capy. #5 down

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3 PHASE 60 CYCLE

Quan.	Size	Description
2	3000 HP	DC MOTORS—525 V., 600 RPM, Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1	2750 HP	DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Exc.
1	2250 HP	DC MOTOR 600 V. 400/500 RPM. G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1	1500 HP	DC MOTOR 600 V. 680 RPM Whse. M.G. Set. 1500 KW G.E. 11000 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Rectifiers, Mill Motors, etc. See last week issue.

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100 CFM	125 psi	8 x 7 Ing. or Worth.
138 CFM	100 psi	7 x 7 Ing. ES-1.
140 CFM	3500 psi	12¼ x 10 Norwalk TR84T
191 CFM	300 psi	9-4½ x 9 CP-T
234 CFM	100 psi	9 x 9 Ing—Worth.
268 CFM	500 psi	10-4½ x 10 Ing.
311 CFM	1500 psi	10½-7½-3½ x 13 Ing. ES8
465 CFM	100 psi	12 x 11 Ing.
502 CFM	125 psi	12 x 13 Worth. HB.
585 CFM	100 psi	15-9½ x 12 Ing. 3-60-4180.
628 CFM	100 psi	14 x 13 Ing. ES
676 CFM	100 psi	15-9½ x 12 Ing. XRB-Worth.
860 CFM	125 psi	13-8 x 7 Jay WN102 150 HP 3-60-440.
870 CFM	125 psi	17-10½ x 12 Ing. XRE 3-60-220.
973 CFM	125 psi	18-10 x 7 Ing. XLE 150 HP Syn 3-60-440.
1055 CFM	100 psi	18-11 x 12 Ing. XRE. Worth. portables 60'-600"

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9/16" Cleveland Model A, m.d., 1943
1-1/16" Cleveland Model B, m.d.
4 spindle 1⅝" Cleveland, Model M., m.d.
4 spindle 2" Model K Cleveland, m.d.
2½" Cleveland, m.d., Model A
No. 4D Potter & Johnston, m.d., late
No. 5DELX Potter & Johnston, m.d., late
No. 5D2 Potter & Johnston, m.d.
5¾" Cleveland Model A Single Spindle, m.d., late

BOLT THREADERS
Victor Nut Facing Machine, m.d., cap. ⅜" to 2" nuts
1½" Landis 2 spindle, m.d.
1½" Landis Bolt Threading Machine, double head stay bolt, m.d.

BOREMATICS
No. 44 Heald Facing Type Borematic, m.d.
No. 47A Heald Single End, m.d.
Model D8-102 Excello Double End Boring Machine, m.d.

HORIZONTAL BORING MILLS
No. 2ST Giddings & Lewis, m.d.
No. 32 Lucas Table Type, m.d.
No. 1 Cleveland Horizontal Boring, Drilling & Milling, m.d.
3½" bar Cincinnati Gilbert Horizontal, boring, Drilling & Milling, floor type
4½" bar, Model 72, Niles-Bement-Pond, m.d.
5½" bar Niles-Bement-Pond, m.d.
6" bar Sellers Floor Type, m.d.
Barrett Double End, 5" and 7" spindle, m.d.

VERTICAL BORING MILLS
16" Bullard Mult-au-matic, m.d.
24" Bullard Spiral Drive, m.d., 1943
36" Bullard, m.d., late 1944, Spiral Drive
36" Bullard Spiral Drive, m.d.
42" King, m.d.
42" Bullard, New Era, m.d.
44" Putnam, m.d., p.r.t.
53" Niles Heavy Pattern, m.d., p.r.t.
60" Bullard, m.d.

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12x72" Thompson Automatic Flat Broach, m.d.
10 ton, 84" stroke LaPointe Single Ram Vertical Surface Broach, m.d., late
Type SBD-42-6 American Vertical Hy. Dup. Broach
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1—3000# HEROULT—1200 KVA, 2300 V.
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1—6' dia. WHITTING Duplexing 8 ton/hr.
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1—20 KW AJAX Spark Gap 17# Melting
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1—333 KW AJAX 1000# Steel Melting

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1—36x42 WHEELABRATOR w/loader
1—48x42 WHEELABRATOR w/loader
1—48x48 WHEELABRATOR w/loader & dust collector
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1—PANGBORN TABLAST, 8' Table
5—SLY Tumbling Barrels, 40" dia. x 62" L.
10—5 to 15 Hp Hevi-Duty, Double End Grinders
1—MUMMERT-DIXON 10 Hp Swing Frame Grind.
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CLIMAX Model 2-A Wire Straightener

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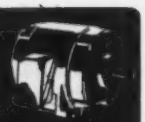

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1000	*G.E.	M-575-S	1200
1000	*West.	CW	450
600	*G.E.	M-5345-S	1800
500	G.E.	M-5345	1200
400	*G.E.	MTP-565	1200
350	*Al-Ch	ARYW	1800
300	Cr-Wh	SR76-R	1800
250	Al-Ch	ARY-628	1800
250	*G.E.	I-M-17A	720
200	G.E.	I-M-16	900
200	*West.	CW-1950A	514
150	Cr-Wh	SR-50R	1800
150	G.E.	I-M-15A	600
125	G.E.	I-M-13A	600
100	G.E.	I-E-13A	1800
100	G.E.	MT558	720
100	G.E.	I-M-15A	425
75	West.	CW-770	1200
75	G.E.	MT-347	1200
75	G.E.	MT-356	900
75	G.E.	MT-352	720
75	G.E.	I-M-10	600
60	G.E.	MT-350	1200
60	*West.	CW-782C	900
50	*G.E.	MT-536	1200

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3,000# Chambersburg, 40" stroke, 85 SPM, 8"x16" die face, 125 H.P. M.D.

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1000 HP Alco Diesel Electric Switcher Locomotives. New 1945. Modern-excellent. ICC Equipped.

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30 Ton Browning Diesel Loco. Crane

60 Ton Link-Belt K-595 Lifting Crane. 120' Boom. Cat. D-17000 Diesel.

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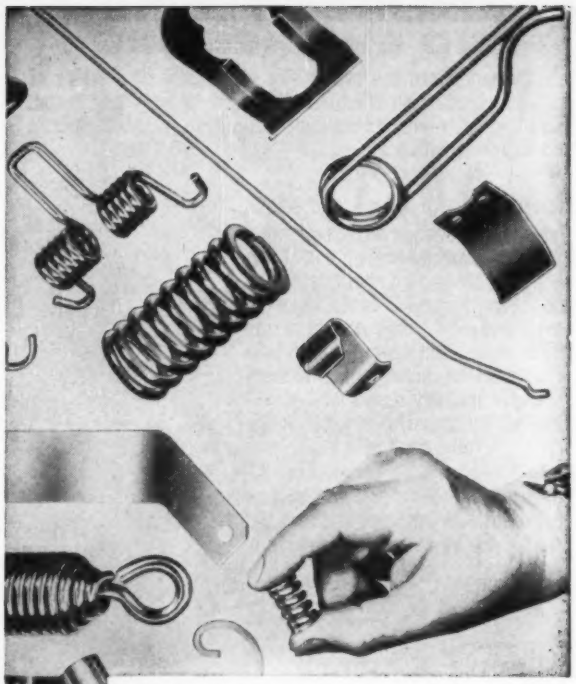

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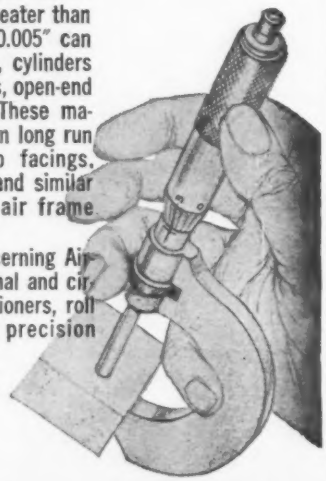

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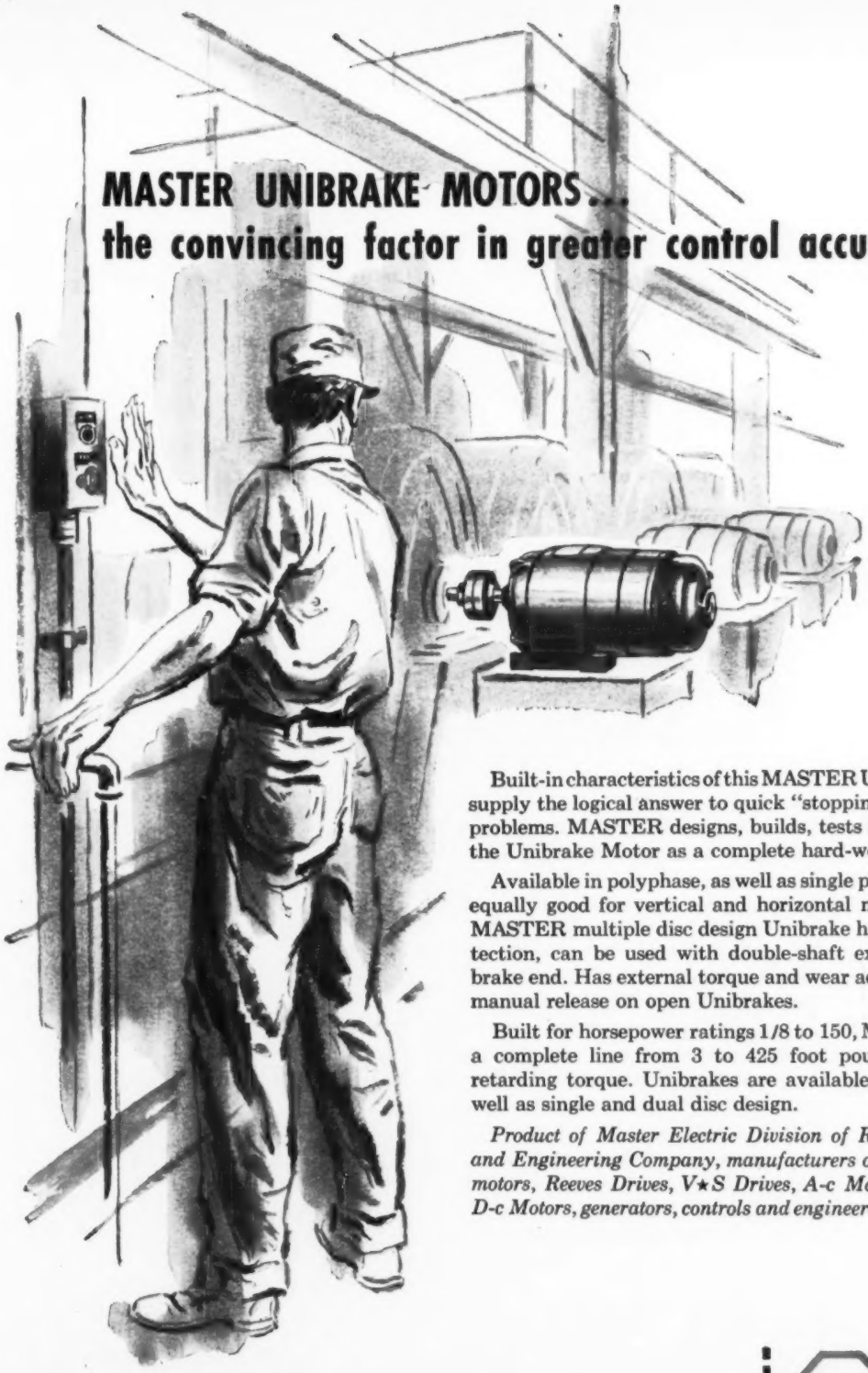

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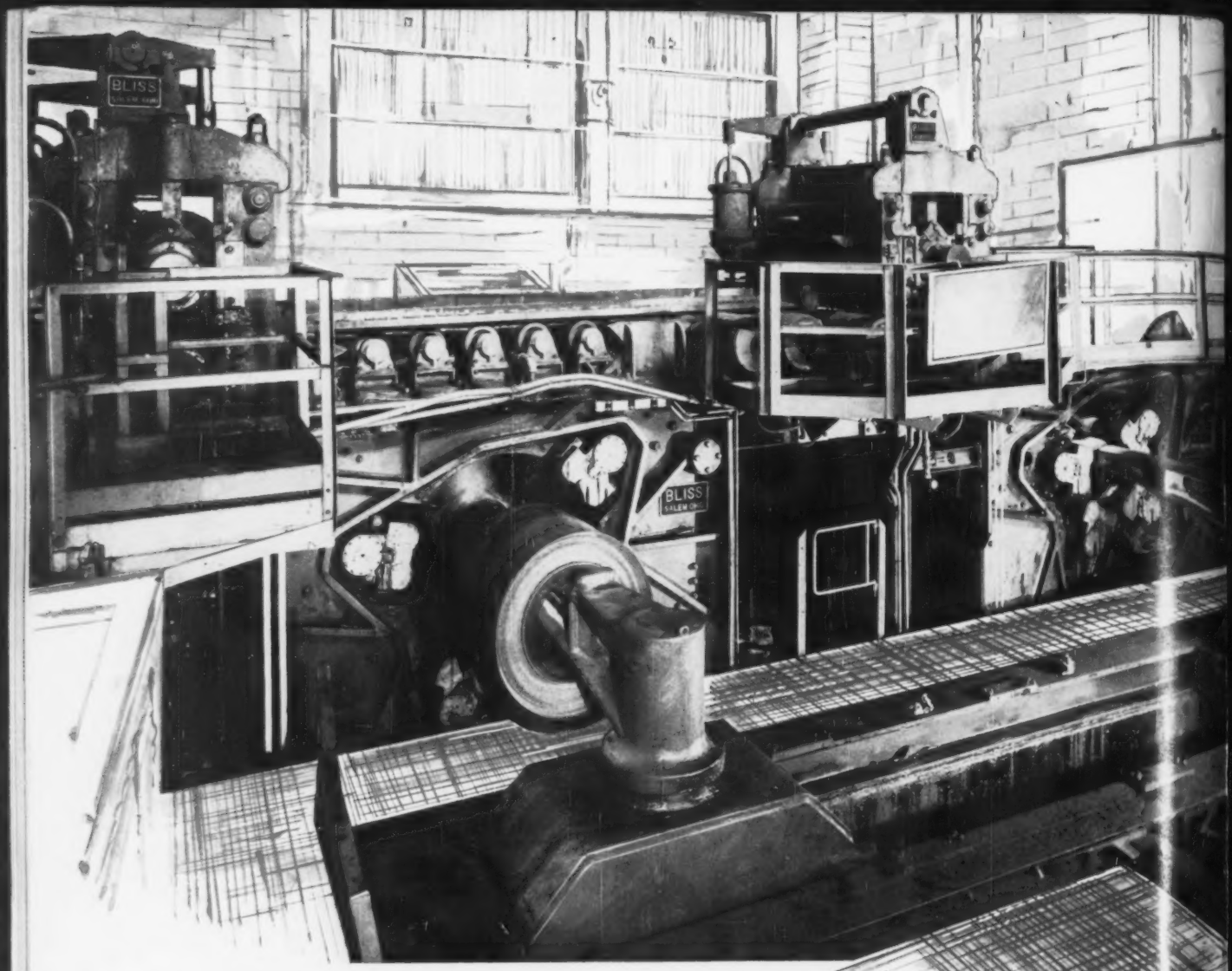

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